

Original Communications.

THE TREATMENT OF GRANULAR OPHTHALMIA AND ITS COMPLICATIONS IN SOUTH INDIA.

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THIS paper has been advisedly headed the "Treatment of Granular Ophthalmia," as it is not intended here to discuss the many interesting points that arise in connection with the ætiology and the well-marked seasonal prevalence of this disease. In Madras City, and as far as I can learn in other parts of the Presidency as well, trachoma is epidemic in certain months. The intractability to ordinary treatment of this disease, and its proneness to severe complications are well known, and the result is that long after the original epidemic has subsided, the surgeon is still treating the disease, either in its uncomplicated, or still more commonly in its complicated, forms. It is my belief that, where sufficient time is available, and where prompt and suitable treatment is adopted, the majority of cases of trachoma are readily and quickly mastered. Even those long continued and neglected cases in which entropion and corneal affection have supervened, often yield the most brilliant results, bringing inexpressible relief to the patient and proportionate credit to the surgeon. For purposes of treatment, I shall discuss trachoma under several different clinical headings:

1. *Acute Granular Ophthalmia.*—A number of cases present themselves in which it would be difficult for the surgeon to decide, whether the primary condition is that of an acute granular ophthalmia, or whether an acute catarrh has supervened on a longer standing chronic trachoma. This is not to be wondered at when we remember how slight may be the symptoms of the chronic granular condition, and how unobservant the less educated classes of natives naturally are. Whatever may have been the origin of the acute condition, its main clinical features, as we see it, are those of suppurative or catarrhal ophthalmia; indeed in not a few cases the recognition of the granular origin of the disease may be only possible when the acute symptoms have been subdued by suitable treatment.

Treatment.—The first indication is to attend to the affection as if it were a simple suppurative or catarrhal ophthalmia. In the former case, leeches, antiseptic irrigation of the conjunctival sac, purgation, and the usual routine text-book treatment should be adopted. While if the symptoms be those of catarrhal ophthalmia, our main reliance should be placed on silver nitrate solution applied with a brush to the everted eyelids, in strength from 5—20 grains to the ounce,

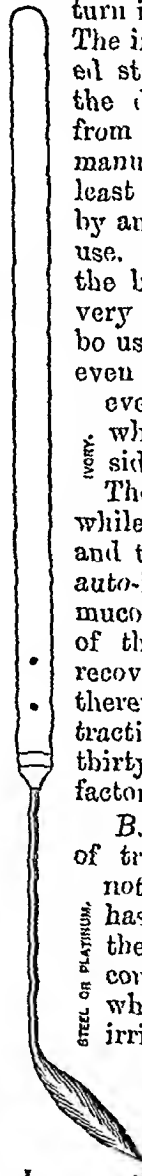
according to the activity of the inflammation; the stronger point being indicated in the acuter cases. It is remarkable how diffident some medical men are in the use of silver nitrate applications; they seem to have an unreasonable fear of this most valuable and when properly used, most harmless and, useful of drugs. Under suitable treatment, a case of acute granular ophthalmia rapidly assumes a chronic or sub-acute form.

2. *Chronic Granular Ophthalmia. A. Early Stage.*—One sees a number of cases of chronic granular ophthalmia in which little or no hyperæmia of the conjunctiva exists. Such cases are presumably early ones. The granules are usually small, discrete and easily recognisable; they may be confined to the retro-tarsal portion of the upper lid. If these granules are efficiently destroyed, I believe that the disease in most, if not all, cases may be considered cured.

Treatment.—The granules, having been exposed by eversion of the lids, each granule in turn is burnt out with the actual cautery. The instrument I commonly use, is a pointed steel cautery of the shape shown in the drawing. These are readily obtained from an instrument maker or may be manufactured by a local man. Two at least should be available, one being heated by an assistant while the other is in actual use. In operating upon adults cocaine is the best anæsthetic, but for children and very nervous patients chloroform must be used. No pain follows the operation even in children. The lids require to be everted and painted daily till any catarrh which accompanied the affection has subsided.

The advantage of this operation is that while it destroys every granule completely, and thus minimizes the chance of further auto-infection, it leaves the uninvaded mucous membrane intact, and so permits of the wounded surfaces being readily recovered with epithelium, obviating therefore a tendency to subsequent contraction. I have performed this operation thirty two times and invariably with satisfactory result.

B. Later Stages.—The majority of cases of trachoma come under the surgeon's notice only after a longer or shorter period has elapsed since the commencement of the disease, and consequently there is a condition of chronic or subacute catarrh, which has been set up probably by the irritative influence of the granules. In such cases it is advisable to anæsthetic the lids daily with a solution of silver nitrate (gr. v, ad. ʒi) till the condition is quieter, and the granules may then be burnt out.



(2) A further complication of the catarrhal condition is commonly met with, in which a villous-hypertrophy of the papillæ takes place. This hypertrophy may be so excessive as to partially or completely hide the granules, especially those of the retro-tarsal conjunctiva of the upper lid. At the same time a very abundant growth of granules is commonly found extending down from the fornix to the upper margin of the cartilage. Such cases obstinately resist medicinal treatment.

Treatment.—This consists of the free excision of the strip of mucous membrane above referred to as extending from the fornix to the upper border of the cartilage. The portion of conjunctiva removed should include the maximum possible amount of granular surface. This operation is most easily performed by everting the upper lid and seizing the strip of membrane to be removed with two pairs of catch-forceps, one being placed at each end of the intended incision; a knife or a pair of scissors easily completes the removal. I have commonly performed this operation under cocaine in hospital practice, where time did not admit of chloroform being given, but when possible, I prefer the latter anæsthetic. Where definite granules can be seen on the retro-tarsal conjunctiva, these should be cauterized before obscuring the field of vision by the cutting operation. One sitting suffices for both proceedings. I have removed a strip of mucous membrane from the fornix in twenty cases, and though the amount of benefit accruing has varied considerably, I have always found the proceeding of value in the treatment of the case.

(3) There is another, and probably a still later condition of this disease, in which the villous-hypertrophy is present as in the former case, but the mucous membrane is of a dull brick-red colour. These are very chronic and extremely intractable cases; fortunately, they are not common,—scraping the mucous membrane with a sharp spoon under cocaine, and the subsequent use of copper sulphate crystals is here indicated. I have only found it necessary to perform this operation five times, and the result has always justified the procedure.

(4) In some patients the lids, especially the upper one, become sodden, infiltrated and swollen; even the cartilage is affected as shown by its unnatural softness, and entropion is commonly present. Such cases will improve under general tonic regimen, and the local application of a silver nitrate solution (gr. v—viii, ad. ʒi).

(5) In very old standing cases the hypertrophy of the villi proceeds to such an extent that conjunctiva assumes a ragged polypoid condition. Rarely large polypus-like pedunculated filings are present, which may attain the size of a French bean or larger.

Treatment.—Under cocaine the mucous membrane must be trimmed up with scissors, any

polypus-like masses being removed, and the surface scraped with a sharp spoon. Subsequently the local use of silver nitrate is indicated.

(6) As is well known, the final stage of granular ophthalmia consist in a cicatricial condition of the mucous membrane of the lids, in which paradoxical as it may seem, granules are entirely absent. These bodies have undergone degenerative changes, and have involved the mucous membrane in their fate. On everting the upper lid, its mucous surface has a pinkish blue colour, which is quite characteristic, and often longitudinal bands, which mark the presence of new-formed connective tissue tracts, are easily visible.

THE COMPLICATIONS OF GRANULA OPHTHALMIA.

The common complications of this disease are well known. They may be classified under two heads:—

(1) Affections of the lids.

(2) Affections of the cornea.

1. *Affections of the lids.*—These include (a) entropion, (b) trichiasis and distichiasis.

Entropion.—Of the various operations for entropion, I consider that a modification of Streatfield's method is at once the most certain and of the most universal application. It is capable of adaptation alike to the slightest and to the most severe cases that we meet with. The excision of a strip of the super-tarsal structure alone is, I think, very rarely a permanently useful operation, nor have I found Arlt's method nearly as satisfactory as Streatfield's, while the various operations, in which a flap of skin is brought down to increase the mucous surface, are obviously objectionable. There is this great advantage in confining oneself exclusively or nearly so to Streatfield's operation, viz., that the surgeon learns, by experience, the exact amount of compensatory eversion, which it is necessary to produce in any particular case.

Operation.—An eyelid clamp having been applied, an incision is made as recommended by Streatfield, immediately above the root of the eyelashes, and is carried down to the tarsus just avoiding, and at the same time laying bare the hair bulbs. The usual crescentic incision with its concavity downward is next made through the skin meeting the extremities of the first incision near either canthus; the flap of skin so marked out is dissected off the tarsus, the muscular and connective tissues superjacent to the cartilage being at the same time removed. The cartilage is thus laid bare in the floor of the wound, and the surgeon can now remove the wedge-shaped piece of cartilage accurately and easily. Though this modification may be less elegant than Streatfield's original method of removing the wedge of cartilage and the superjacent structures by one and the same incision, it has two decided points in its favour, viz. (1) it is much easier, and (2) it enables the surgeon to

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recommends that, previous to stepping in cold rain-water, accurately adapt the size of the cartilage to the needs of the individual case. In many cases the cartilage is thickened and easily found, but on the other hand, it is sometimes atrophied, and therefore less easily recognisable. If, however, the surgeon first searches for it at the lower margin of his wound, he will have little difficulty in recognising it in either case, as here he encounters it at its thickest part. The sutures are passed as recommended by the author of the operation. It will thus be seen that we have two methods of checking the amount of compensatory eversion produced, *viz.* (1) the size of the flap removed, and (2) the depth and breadth of the groove made. This operation is easily performed on the upper lid, but is more difficult in the case of the slenderer cartilage of the lower lid. In those severe and old standing cases in which the whole of the lash-bearing edges of the lids are inverted, including the outer canthus, I have obtained admirable result by freely dividing the structures of the outer angle of the eye down to the bone before attacking the cartilages of both lids.

Distichiasis and Trichiasis.—Are commonly associated with entropion, and in many cases the operation, which has just been described, will meet the patient's needs. Where, however, the general-ity of the lashes take a normal direction, and only a few are intumed, it suffices to remove one or more small wedges of skin including the bulbs of the offending hairs. As in these cases the incurved hairs are frequently of new growth and lighter coloured and shorter than the normal lashes, they may be easily overlooked unless carefully examined for under oblique illumination. Any case of old standing granular ophthalmia associated with corneal complications should invariably be very carefully scrutinised to exclude the source of mischief.

Some may consider me prejudiced when I acknowledge that of the operations I have just discussed I have performed Arlt's only four times and the skin-flap operation only ten times, while in hospital practices alone, I have forty-four times performed Streetfield's operation. My answer to such would be that I have never known the last named method fail to produce excellent results, whatever might have been the amount of deformity it was intended to combat. Its ready adaptability to all cases is a very powerful recommendation.

2. *Corneal Complications*.—These have been attributed by some writers to a specific infection of the cornea from the diseased lids, while others have thought that the lesion was due to the repeated friction of the roughened palpable conjunctiva against the corneal surface. It has been pointed out that corneal affections are often met with in cases in which the conjunctiva, though diseased, is apparently smooth. On the other hand, one must remember that in nearly every case (I have never seen an exception to this rule), the corneal mischief rapidly

It is undeniably difficult to efficiently disinfect certain localities such as those of the groin, under treatment. *prn* condition of cornea that one commonly meets with in granular cases may be described as a diffuse interstitial keratitis, commonly associated with superficial ulceration. In some cases the ulceration extends in depth, and anterior staphyloma, perforation, anterior synechia and destruction of the ball may result.

Treatment.—In all cases, the first point is obviously to treat the condition of the lids. Should the eye be ulcerated and in an irritable condition, it is not safe to apply stimulating ointments, and much good will be done by washing out the conjunctival sac three to six times daily with boracic lotion; eserine or atropine being used as indicated by the position of the ulcer, and the state of tension of the eye. In early cases and in fact in all cases where the eye is quiet, much advantage will be gained by the daily use of a small quantity of yellow oxide ointment (gr. viii, ad. 3i); this should be placed in the conjunctival sac beneath the lower eyelid, and should then be rubbed in by a circular movement of the patient's forefinger, applied outside the lids for 3 or 4 minutes each time.

Two other corneal complications merit our attention. Of these, one, *viz.*, pannus, is very common, while the other, xerosis of the conjunctiva, is very rare.

Treatment.—In early cases, pannus will disappear when the lid is cured, the yellow oxide ointment being a valuable auxiliary in the treatment. In later cases, however, the condition is much more obstinate, and calls for operation. I must confess that I have never tried jequirity in these cases, the balance of opinion against it leading me to think it unjustifiable. I have, however, obtained most excellent results by free peritomy. In performing this operation, care should be taken to remove not only the conjunctiva but all the sub-conjunctival tissue right down to the sclerotic. Speaking from an experience of twenty-seven peritomies, I do not hesitate to say that I believe that this operation, when thoroughly performed, never fails to give benefit even in the most obstinate cases. The after reaction is often alarming to the novice. I have, however, never seen any harmful results follow, the condition always subsiding satisfactorily under antiseptic irrigations. When the irritable condition has quieted down, the eye is found to be distinctly improved. Should some amount of pannus still remain after the subsidence of all signs of irritation, the circum-corneal ring of tissue may be carefully destroyed with the actual cautery.

Xerosis of the Conjunctiva.—In an experience of a large number of cases of granular ophthalmia during the 13 months that I acted Superintendent of the Government Ophthalmic Hospital, Madras, I only saw two cases of xerosis, one of them remained for treatment, his lids were treated on ordinary principles and

junctional sac as above described. A week later I showed the patient at a meeting of the Local Branch of the British Medical Association, and though the condition was still easily seen, the patient had improved so rapidly as to "spoil the case for show purposes." The sufferer returned to his native village shortly afterwards, supplied with the necessary local applications, and was so lost sight of.

In this paper I do not claim to have made any new or startling discovery, but I have endeavoured to formulate clearly my views as to the treatment of this affection. My motive in doing so has, I think, been obvious. It has been to show how easy and how satisfactory the treatment really is, whereas experience has shown me that, in a country where the disease is so very common, it is too often ill understood and mistreated.

AGAR-AGAR.

BY SURGEON-CAPTAIN A. E. GRANT, I.M.S.

A CONSIDERABLE amount of agar must now be used in the various bacteriological laboratories in India, and this amount is likely to increase in the future. So far as I am aware, it is not generally known that this article can be obtained locally and of at least as good a quality as that re-imported from Europe. I therefore send a few notes regarding its source and uses, chiefly for the benefit of those engaged in bacteriological work, but also for the purpose of directing attention to an article of dietary for the sick which appears to possess certain advantages.*

Agar consists of the dried fronds or filaments of a sea-weed, to which various scientific and colloquial names have been given. It thus belongs to the class of edible *algæ*, of which Irish moss so-called (*Chondrus sp.*), is a well-known example. By algologists it has been named *Plocaria candida* (Nees), *Gracilaria lichenoides* (Greville), etc., and by the late Dr. O'Shaughnessy *Fucus amylaceus*. In English it is called Ceylon Jaffna, or edible 'moss.' The Malay name is *agar-agar carange*; the Burmese call it *kyouk kwen*. Amongst the Muhamadans in Madras it is known by several names meaning sea-grass, e.g., *darya ka pachi*; *karal pachi*, a hybrid word, karal being the Tamil for sea. Another name is *Kumr qhat* or 'strengtheners of the loins,' from the idea that it stimulates the generative organs. In Bombay it is known as *Chinai-Ghas*.

I first discovered that it could be purchased locally by a patient in hospital mentioning a wonderful jelly that was eaten by Muhamadans at certain seasons. It is sold in bundles tied up with grass rope and is retailed at about Rs. 2-12-0 per lb, whilst the English agar costs about Rs. 3-8-0 exclusive of carriage, etc. I have no doubt that larger quantities could be obtained

* It must be well known to writers on Indian pharmacy, etc., but its use for bacteriological purposes in this country is comparatively recent as compared with most of the writings on the former subject.

at a lower price. For laboratory work it makes quite as good, if not a better jelly than the European stuff. The following extracts are taken from the excellent (unfinished) revised edition of Ainslie's *Materia Medica*, issued by Messrs Higginbotham & Co., Madras. It was through seeing the Malay name of agar-agar in this work that I identified karal pachi and agar as one and the same thing, and it will be noted that it is stated that Ceylon moss is obtainable in the Madras bazaars, and elsewhere in India, I take it.

"The consistence of the moss is cartilaginous; its flavour that of sea-weed, with a feebly saline taste (Percira). The present specific name of the plant [*p. candida*] appears to have been given it from a mistaken idea that the moss is naturally white, whereas it only becomes so by frequent washing in fresh water and bleaching in the sun; its natural tint being a shade between olive and purple, such as the natives designate red.

"*Habitat.*—Ceylon at Jaffnapatam and the islands of the Indian Archipelago. [It can be obtained at Singapore, Penang, etc.—A.E.G.] From the Cycl. Ind. we learn that it grows abundantly in the large lake or back-water that extends between Putlam and Calpentyr, Ceylon. It is collected by the natives principally during the South-West monsoon, when it becomes separated by the agitation of the water. The moss is spread on mats and dried in the sun for two or three days. It is then washed several times in fresh water and again exposed to the sun, which bleaches it, after which it is collected in heaps for exportation. We have ourselves seen the moss brought ashore at Ramiswaram (Paumben) where it appears to be abundant. *** The Chinese consume it largely in the form of jelly with sugar. This jelly is constantly carried about the streets in Singapore for sale. The Chinese consider it an excellent paste. The gummy matter which they employ for covering lanterns, varnishing paper, etc., is made chiefly, if not entirely, from it. In England, Archer informs us that the jelly is used for dressing silks. According to the latter authority, another seaweed, the *Fucus Spinosus* occasionally, takes the place of our present article in the English market. The Ceylon moss is to be had in Madras in the bazaars."

Several analyses of this moss have been made; the following is the one by Dr. O'Shaughnessy:

Vegetable jelly (pectin)	...	...	54.50
True starch	...	...	15.00
Lignous fibre	...	...	18.00
Gum	...	...	4.00
Wax	...	...	a trace
Sulphate and muriate of soda	...	...	6.50
Sulphate and phosphate of lime	...	...	1.00
Iron	...	...	a trace
			99.00

Assume the traces of wax and iron, and the loss, at 1.00

Total ... 100.00

O'Shaughnessy recommends that, previous to cooking, it should be steeped in cold rain-water to remove the sodium salts, then dried and *pounded*. He says that grinding is essential to break up the lignous fibre (cellulose) and fill the starch cells. The usual method of preparation is as follows: "Put into an open stew-pan half an ounce of the prepared moss, and a quart of boiling water. Boil briskly for 25 minutes and, until a spoonful of the liquid forms into a firm jelly within two or three minutes after it is taken from the pan. Flavour with wine, a little cinnamon, lemon or orange juice and peel, and sweeten according to taste. Boil the whole for five minutes and pass it two or three times through a jelly bag or doubled muslin. Leave it *undisturbed*, and it will become a firm jelly in ten minutes. If it be required perfectly clear for table use, add the white of two eggs beaten up into a whip before the second boiling, and allow it to stand for a few minutes away from the fire, with some hot coals on the cover of the pan. When clear pass it through the jelly bag and leave it to congeal. Should the jelly be required particularly firm add an ounce of the moss to the quart of water. The moulds best adapted for this jelly are of white earthenware, to which it adheres much less than to tin or copper. No heat is required to separate the jelly from the mould, but a little care is necessary in turning it out, on account of its brittleness or want of elasticity. One pound of the prepared moss will make sixteen quarts of jelly.

The decoction of the moss is prepared by boiling it in water, milk and whey 3i to 3viii of liquid, and flavouring to taste. The jelly or decoction, according to Pereira, is a light and readily digestible article of food for invalids and children, and is not apt to occasion thirst, sickness, flatulence, acidity or diarrhoea. Waring says it is specially serviceable in convalescence after fevers and debilitating diseases.

The following books contain reference to this article: O'Shaughnessy, *Beng. Disp.*, p. 668; Macon, *Nat. Prod., Burma*, p. 179; Balfour, *Cycloped. Ind. art. 'Fucus'*; Pereira, *Mat. Med.*, Vol. II, Pt. I, p. 13; Lindley, *Flor. Med.*, p. 630; Archer, *Econom. Bot.*; Waring, *Therap.*, 2nd Ed., p. 552; Dymock; *Veg. Mat. Med. W. Ind.*; Watt, *Diet. Econ. Prod. Ind.*

THE DISINFECTION OF THE SKIN IN SURGICAL OPERATIONS.

By SURGN.-CAPT. J. CHAYTOR-WHITE, M.D., I.M.S.,
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ONE of the most important parts of aseptic surgery is the efficient treatment of the skin of the patient to be operated on. I have almost invariably found this part of the treatment left to the Assistant-Surgeon or dresser, and in native hospitals it is as often as not performed in a most perfunctory manner.

It is undeniably difficult to efficiently disinfect certain localities such as those of the groin, scrotum, anus, and female genitals; but even they can be disinfected and kept aseptic if care be exercised. Speaking generally natives are difficult to disinfect and, as a rule, need more attention than Europeans, and, at all events as regards the generality of dispensary patients, are filthy and dirty, with dirt ingrained into their skin. The hard skin of the hands and feet of natives is particularly hard to disinfect, and all areas covered by thick hair are difficult of disinfection. Moreover, neglected skin is more difficult to disinfect than that better cared for, and exposed portions of the body than those covered up.

The skin beneath the nails is hard to disinfect and it harbours many bacilli. Mere washing as usually practised is quite insufficient, and for proper disinfection the nails should be clipped close and the fissures under the nails cleaned with soap and water, and with a brush which should always be kept in mercury solution. The hands should then be well rubbed with the red iodide of mercury spirit solution noted below, but in spite of every care pieces of skin, after the most careful preparation, placed in cultivation media grow colonies which are usually, however, of the non-putrefactive variety.

It is of course impossible to have all the magnificent appliances of the modern antiseptic theatre in every small district dispensary, but in one item at all events every hospital in Europe or India is on the same level. Every hospital can have its boiling water. One of the pioneers of antiseptics used to say "Boil, boil, boil everything that is dead and let nothing that is not boiled touch the living."

The skin of your patient unfortunately is living, and we cannot boil it, and for disinfection we have mainly to depend on chemicals. No portion of the human skin is free from bacteria. The sweat and sebaceous glands are crowded with them, and they are particularly hard to kill or even to render inert.

Streptococcus pyogenes, *staphylococcus aureus* and *albus*, *staphylococcus epidermitis*, *bacillus epidermitis*, and a long list of other cocci and bacilli can be cultivated from a square inch of skin from almost any part of the body. The three first mentioned bacteria are the commonest causes of suppuration in wounds, and they are the special enemies we have to guard against.

The skin solution above mentioned is for disinfecting the skin and hands, and is made as follows: One drachm of biniodide of mercury is shaken up with one drachm of iodide of potassium and one ounce of rectified or methylated spirits is added, making a solution of 1 in 50 of biniodide. Half an ounce of this stock solution is added to 5 ounces of rectified or methylated

spirits and is sufficient for rinsing the hands well or cleansing a skin surface before an operation.

The following is the procedure adopted for preparing the skin of the patient before operation, and I have a copy of it always hung up in the dispensary :—

(1) Thoroughly shave the part and remove loose hairs with a piece of wet wool.

(2) Thoroughly scrub the skin with soap and water.

(3) Then rub on methylated ether, or turpentine with a swab of cotton-wool for five minutes. This dissolves the fatty and sebaceous matter in the glands and allows the disinfectant to penetrate.

(4) Disinfect skin by rubbing in the solution of 1 in 500 rectified spirit and iodide solution for 5 minutes.

(5) Without delay put on skin dressing.

(a) 5 per cent. carbolic gauze soaked in biniodide solution (1 in 2000) next skin.

(b) Cover with layer of sal-alembroth wool.

(c) Then cover with three layers of 5 per cent. carbolic gauze and cover all with a layer of waterproof or gutta-percha tissue.

In England biniodide of mercury is now preferred to the sublimate as it is a safer antiseptic, and it does not combine with albumen as the perchloride does. For washing out cavities it is excellent, and when mixed with blood, for the above-mentioned reason, no precipitation occurs—a considerable advantage where sponges are used.

THE EPIDEMIC OF BUBONIC PLAGUE IN HONGKONG, 1894.

By JAMES A. LOWSON, M.B.,

Medical Officer in charge of Epidemic Hospital.

To write an historical introduction upon the subject of Plague should, at the present moment, be an easy matter, considering the many classical monographs and articles which have been written upon it within the last century. When the present outbreak occurred in Hongkong, the only authority that I had at my disposal was the article on Plague in Quain's "Dictionary of Medicine," by J. N. Radcliffe, the experiences that we have had here being to a considerable extent new to the present generation. Latterly, the articles in the *Encyclopædia Britannica* and Davidson's *Tropical Medicine*—not to mention Hecker's classical work—were brought to my notice. I have not been able to make myself familiar with the opinions of Cabiadis and others in print, consequently, the notes on the disease which I now present are almost solely founded on experiences here during the past year.

The history of plague, as regards the civilised West, has been told times without number, but, with the exception of Rocher's papers, the his-

tory of the disease in the Far East is a perfect blank. One would expect, seeing that China has the unenviable reputation of being the seat of the plague, that the Chinese classics would show some trace of the existence of epidemics of the disease. I have requested Mr. J. Dyer Ball, one of the most eminent and certainly one of the most painstaking of Chinese scholars, to make careful enquiry into the subject, and the result is that, after months of diligent searching, he finds that Chinese history makes no reference to any epidemic which has left a mark on the ineffaceable records of time. The epidemic in Canton of 1894 is by far the most noticeable case (of which there is any record) of the disease, carrying off large numbers of the population. The first time in contemporary history that plague has really made itself felt in China, was in 1844—just after the Egyptian epidemic had left its mark on European medicine,—and in this case, by the records at hand, the epidemic did not work nearly so much havoc amongst the population as it did during the year recently finished. Plague has been practically endemic in Pakhoi for over twenty years, as has been recorded by Drs. Lowry and Horder; the only occasion when it has been at all epidemic being about ten years ago.

The epidemic in Canton, according to the information at our disposal, began early in February 1894. During the four months following it was practically unknown in Pakhoi. In May it broke out in Hongkong, ninety miles from Canton, and three hundred and seventy miles from Pakhoi. Negative evidence is wanting to show that it did not come from Canton. Positive evidence is wanting to show that it came from Pakhoi.

An average of 11,090 passengers came from Canton every week, whilst only 64 came from Pakhoi.

There were many patients fleeing from Canton on account of the plague—none fleeing from Pakhoi.

Most certainly tens of thousands of persons died from plague in Canton, from January 1st to May 1st, 1894, whilst the dead were to be reckoned by tens only in Pakhoi during the same period, there being three or four steamers every day from Canton to Hongkong, whilst there were only six in a month from Pakhoi.

Since 1873, it has been endemic in the province of Yunnan, a district about 900 miles from Canton, where the numbers dying of it yearly have been considerable. All this circumstantial evidence goes to prove that the disease was imported to Hongkong from Canton (and not from Pakhoi), although in Canton it has been unknown, until the present outbreak, since 1850.

On March 2nd, 1894, a large Chinese procession was held in Hongkong, and as a result large numbers of people came from the surrounding country, it being estimated that 40,000

of the lowest class coolies came from Canton for the occasion. It has been maintained by some persons that this was the period during which Hongkong became infected. It is possible, but it appears to me that before nine weeks had elapsed the epidemic would have reached such alarming proportions that it must have been noticed earlier. It was only in April that people were reported as fleeing from Canton on account of the plague, and as these people were almost certain to have been in contact with the sick, it is most probable that some of them brought the disease into the Colony.

The Overland Friend of China of 23rd May 1850, contains the following:—

“The city of Canton, and the neighbouring towns and villages are afflicted by a malignant fever. It is commonly called Typhus; some Europeans—physicians—are of opinion that it is akin to the yellow fever of the West Indies, others think that it resembles the plague which desolated London two centuries ago. The disease is said to be fatal invariably, its victims linger three or four days, though in some instances they have died in twelve hours. More than one European doctor cheerfully offer their services,—but the Chinese are obstinate in their adherence to old custom—old ignorant quackery. The distemper has not made its appearance at the factories, and as it may arise from a want of cleanliness among the people, we are in hopes that it will not extend to Europeans.”

The following remarks by A. P. Happer, jr., in the Imperial Maritime Customs' Annual Report, 1889 (dated 22nd February 1890) are those of a most careful observer, although some of his statements as to the limitation of the disease are erroneous—probably owing to a lack of knowledge of the literature upon the subject:—

“In spite of such a favourable climate Mêng-tzü (in Yunnan), in common with other parts of Yunnan, has suffered annually for a period of years from the plague (Chinese letters), a kind of malignant fever, fatal in a few days, having as one of its symptoms a hard swelling on the neck, in the armpits or in the groin, which has carried off a number of its inhabitants. Indeed the presence of fallow land in the near neighbourhood of the city is attributed to the decimation of the farming population by the pest. On approach of the epidemic, the first victims are rats, which, fearless of human beings, rush madly into their presence, and after capering around the room fall dead at their feet. The next to suffer are cattle: the fatal effect among them is equally as great. Sur-

rounded by such distressing signs, it is no wonder that inhabitants of hamlets often desert their houses and belongings *en masse*, to seek immunity on the mountainside; for a curious fact about the disease is, that it never descends to places under 1,200 feet of altitude above the sea, and it rarely scales heights over 7,200 feet high. Strangely enough also, it seldom attacks people sojourning in Yunnan from other provinces, its victims being confined to the aborigines and to native-born Chinese. This disease certainly offers an interesting field for the study of Western medical science, and the physician who will find a specific against its ravages will be hailed as the deliverer of Yunnan, so helpless are the native practitioners in treating it.”

The question of the infection of rats, previous to the epidemic being noticed in human beings, has been made too much of, as have several other points in connection with plague. It is only natural that as rats have their snouts about an inch above the floors of houses they are much more liable to inspire plague-infected dust than people who have their mouths at least two feet higher. Inoculation too is easy. It must be remembered that rats usually die two or three days after inoculation; therefore, the statement that the deaths of rats generally precede an epidemic—although generally true—is only dependant on the fact that rats and other small animals are peculiarly liable to be infected, and have a very short incubation period of the disease. Their habits and residence also conduce to their early affection after the disease has been introduced.

Many points have yet to be cleared up scientifically, as for instance the infection of pigs and cattle. It has been stated that these animals suffer from the same disease, but it would be better, by our later experience, to prove that it is definitely plague. I regret that after the hurry of the late epidemic our stock of plague bacilli has disappeared, but it is to be hoped that an opportunity for elucidating some doubtful points will occur later on. Going upon recent experience here we have as yet no definite proof that, during this epidemic, pigs, cattle and dogs were infected. Kitasato's observations were unfortunately limited to what may be termed “Toy” animals, and it would have been more satisfactory if animals which are generally used for human consumption had been utilised also for experiment, and the direct connection of the disease between human beings and these animals had been definitely proved, so much depending on the food-supply of certain communities in the Far East at the present moment.

It is satisfactory to know that the *causa causans* of the plague has been discovered, and some of us must regret that our time, being

entirely taken up by practical work in connection with the treatment of the plague—for which no fame is secured—we had so little time to look to the more purely scientific side of the question.

In the following pages stress has been laid on the paucity of medical men who could be found to help in our extremity. It may be thought that we surely had enough time to make some efforts in the direction of discovering bacilli. I can only say that after a day of from twelve to eighteen hours hard and exciting work in the trying heat of a Hongkong summer none of the men who had to bear the brunt of medical supervision, and who had to look forward to a prolonged mental strain, were much inclined to start work with the microscope by gaslight,—more especially as they were generally completely tired out and ready to sleep immediately; or were too exhausted to secure the repose necessary to enable them to start afresh next day. It may not be out of place to mention that in the Egyptian epidemic in 1843, half of the French physicians in Cairo perished from the plague; and in the Russian epidemic in 1879 (where Vetlianka was the principal seat of disease with about five hundred cases), the first three medical men who were in attendance on the sick died, as did numerous attendants. These were somewhat appalling figures when the epidemic broke out, and the outlook was not much improved when our numbers went up to four by the addition of Surgeon-Major James, A.M.S., and Surgeon Penny, R.N., the European nursing staff being reinforced by two Police Constables. It is noticeable that none of those who were in active attendance on, or engaged in removing, the sick *during the whole period* were attacked. This I put down to the instructions that were given at the beginning of the epidemic. On the second or third day after the epidemic was discovered, it was proved that the disease could be propagated through the blood by inoculation. The fæces were also suspected as an additional mode of conveyance of infection. Cultures were made from these, but unfortunately this method of infection was not proved until Kitasato arrived, time being wanting to make frequent observations of our culture tubes. In the meanwhile, notwithstanding want of proof, the fæces were always looked upon as the most prolific source of infection carbolic acid or quicklime being added to them before disposal in the sea, and it was a satisfaction to us when Kitasato confirmed our suspicions. The question as to whether infection from the contents of buboes could occur was answered in the affirmative early, and every precaution as regards antiseptics was taken in opening these swellings. With our present knowledge of the nature of the epidemic it may be said (and has been said) that our precautions at the beginning were excessive, but here again

it is the same old story of "wisdom after the event." By the knowledge gained in Hongkong during 1894, plague has been divested of a great deal of its terrors if care be taken by the people engaged in fighting it. Not only this, but if proper sanitary precautions are taken, no civilized country should ever be the seat of an epidemic of plague. I am bound to admit that, if ever any place was ripe for such an epidemic, certain parts of Hongkong in May 1894 were in a condition for it to spread like wildfire. Full details as to the condition of the City of Victoria are given later, and it is satisfactory to know at the present time that *attempts* are being made by those in authority to remedy faults which have been accumulating for years, and which have been pointed out before but without result.

In these times of scientific research it is not too much to expect that some "serum" treatment will be found to neutralize the toxins produced by the Pest Bacilli, and when the further researches of Kitasato and Yersin are published, I hope we shall have some remedy suggested which will enable us to reduce the very high mortality due to plague, should it ever unfortunately come to these shores again.

In the following pages I have avoided theorizing as far as possible, what follows being more a report on the epidemic than a treatise on the disease.

Definition.—Bubonic plague is a specific infectious fever, characterised by the presence of a definite bacillus primarily affecting especially the lymphatic system, and afterwards the cerebral and vascular systems. When considering the symptoms (if this definition is kept in mind) it will be found to embrace all the developments which take place in the disease.

Cause.—The existing cause of the disease is a bacillus which was, so far as the Hongkong epidemic is concerned, discovered first by Dr. S. Kitasato, of Tokyo, on June 14th, in the Kennedytown Barrack Hospital. The bacilli are found in the fæces, in the contents of buboes, and in the blood.

Predisposing causes are, speaking generally, insanitary conditions, and of these—

*Filth and overcrowding*¹ must be reckoned as two of the most important factors.

¹ In 1887 an Ordinance entitled *The Public Health Ordinance* was passed which handed over the sanitary control of the Colony to a semi-representative body called the Sanitary Board. Much of the work so delegated to it has been carried out in an efficient manner. The external scavenging of the streets leaves little to be desired, and many efforts have been made to encourage and foster a higher standard of cleanliness amongst the native population. Unfortunately the Chinaman resents strongly any attempts to interfere with his domestic privacy and a little too much deference has probably been shown to his prejudices in his respect. In any case it must be admitted that the interior of the native houses was such as may fairly be described as a disgrace to a civilized community.

The district of Taipingshan supplied these factors in a marked degree at the beginning of the outbreak, the majority of the houses being in a most filthy condition, as owing to the uncleanly habits of the people the amount of what is generally termed rubbish accumulates in a Chinese house in a crowded city to an extent beyond the imagination of most civilised people. When to a mixture of dust, old rags, ashes, broken crockery, moist surface soil, etc., is added faecal matter, and the decomposing urine of animals and human beings, a terribly insanitary condition of affairs prevails; and that this is no overdrawn picture of what was to be met with in Taipingshan, many Europeans now know to their cost. The habits of the people are filthy, and their surroundings are correspondingly filthy if household scavenging is not looked after properly.

Overcrowding¹ was present also. The question as to how many people may go to the acre without overcrowding, must receive a different answer in every separate town according to the character and height of the houses, and the breadth of the streets. When, however, 30 to 40 people are huddled together with a cubic air space of less than 150 cubic feet per head, and that in a house which has no through ventilation, then one would suppose that it must be admitted that there is overcrowding; nevertheless one finds in Hongkong would-be sanitarians who will not admit the existence of overcrowding on any basis but that of how many go to the acre.

Other *insanitary* conditions were not wanting. In May 1894 in Taipingshan, and in other districts of Hongkong a large proportion of the houses were damp and badly ventilated, with drains of a most primitive and insanitary description. Earthen floors or floors laid with chunks of stones were the general rule, while in most houses light seemed to be looked upon as an enemy to be carefully shut out.

Basements² and cellars have been allowed to be inhabited practically all over Hongkong. These have the most meagre provision of ventilation and light, more especially those to the west of the Civil Hospital, where the hill rises abruptly; and in Taipingshan in the neighbourhood of Tank Lane. Dwellings in these districts are very damp indeed in the summer season, a large number of houses being built directly back to back,³ or with only a very narrow lane between them.

In the infected areas the *drainage*¹ arrangements within private premises are bad, a few houses only having been connected to the new system, whilst the majority have the old-fashioned drains, square in section, badly constructed, leaking in all directions, and favouring deposit of solid matter—especially during the dry season—and directly connected with the old drains which have been relegated to the duty of conveying storm waters since the introduction of the new system. A few have no drainage at all.

The *food-supply* of Hongkong is fairly good, but could be improved from a public health point of view if the wishes of the Colonial Veterinary Surgeon were more carefully attended to. The Chinese here have entertained the idea that the epidemic was caused by eating pigs from Pakhoi, but as none of the pigs imported showed any sign of disease, and as pigs have not yet been proved to be susceptible to the disease, this supposition has to be rejected.

The *water-supply* is very good, but at present it is scarcely sufficient to meet the heavy demands made on it, on account of the waste and misuse of water within the closely built and thickly inhabited areas of the city, the water supply to the Chinese being almost unlimited. Its waste and misuse are, however, being remedied rapidly.

In addition to the Government supply there are numerous wells situated generally in houses, latrines, back-kitchens and other out-of-the-way places. These wells all come within the category of "Shallow Wells" and must as long as they exist prove a serious danger to the public health. These wells are numerous in the affected areas and some of them simply reek with organic matter; others have a considerable amount of ammonia and nitrites; whilst a very few only are at all fit for drinking purposes. To what extent the spread of the epidemic was due to these wells has not yet been determined; it is easy to see the possibility of their pollution by plague patients, but the question has not yet been studied carefully. Many are now shut up.

Latrines.—To my mind one of the most important factors in the spread of the disease was the bad condition of the *latrines*. In Hongkong latrines are in some cases public, and in some cases private property; in both cases they are under the control of the Sanitary Board, and are used by the bulk of the Chinese population, few Chinese dwellings being provided with accommodation of this kind. The following extract from a letter I sent to the Colonial Surgeon bearing date 15th August 1894, explains itself:—

"In my opinion the condition of the *latrines* in the Colony has been partly responsible for

¹ The Health Ordinance provides for overcrowding, but its provisions were not put into effect owing to opposition by the natives. (See section 67 of Ordinance.)

² At the time of the outbreak of the epidemic there was no restriction as to the use of basements as places for habitation.

³ There is no provision for back-to-back and badly ventilated houses.

¹ The Ordinance gives large powers in drainage matters, sections 49-54 dealing with the subject of drains.

"the spread of the plague epidemic. My reasons for thinking so are as follows:—

"(1) The plague bacillus is abundantly found in the fæces.

"(2) There is practically no disinfection of fæces in the latrines. The gutters are washed down occasionally with "a mixture of Jeyes' Fluid and "water, but only some material described as opium packing is added "to the fæces to raise its value as a "manure. This latter is practically "of no use as a disinfectant.

"(3) Several times during the epidemic "these latrines were not cleaned out "as regularly as they ought to "have been. (This is not to be wondered at considering the scarcity of "labour.)

"(4) Plague-stricken coolies must often have "visited the latrines, and each soil "pan must necessarily have become a "great danger to every healthy person who went into the latrine. A "glance at one of these latrines will "at once bring this prominently before you. Their peculiar construction makes it absolutely certain that "any individual using them must "inhale air laden with impurities, and "each soil pan must have been a prolific breeding ground for the poison. "There is here a favourable opportunity for being attacked, as all the "three most usual methods of infection—inoculation, respiration and "entrance by alimentary canal—may "occur.

"(5) Not only this but from the statistics "and facts at present at my disposal, "I consider that these latrines were "a source of infection to houses round "about them, so that it was not "necessary for the people to go into "the latrines to get the disease, it "was probably borne by the air to "neighbouring houses.

"There is a licensed private latrine at 113, "Second Street. At a casual glance the shut up "houses all around bear eloquent testimony "upon this point. Round this latrine there is "scarcely a house occupied.

"In Centre Street at the corner of Third "Street there is a latrine. On passing into "Third Street to the South numerous houses are "shut up, and several cases have occurred in "neighbouring houses.

"At 82, First Street, there is a latrine with an "entrance at 91, Second Street. A very large "number of cases occurred round about this "place.

"Around several other latrines, more especially "at 29, First Street, numerous cases occurred;

"but in some of these instances it is difficult to "prove that the severity of the epidemic was so "locally affected on account of the large number "of cases which occurred in almost every house.

"Sheung Fung Lane, off Second Street and "opposite to No. 91 of that street, is practically "shut up. The mortality here was very great. "The inhabitants were principally night-soil "coolies and *almost all died*. The occupants of "houses in Third Street adjoining this were also "numerously attacked.

"I might mention that there is a latrine, no "doubt well known to the sanitary authorities "in Centre Street Market, and three yards distant "from it a large quantity of meat is often hanging for hours at a time.

"The two questions:—(i) Was there infection "of coolies in the latrines? and (ii) was there "infection of the neighbourhood round about? "must go hand-in-hand seeing that so many of "the inhabitants use the latrine. It must be "remembered, however, that women and children "do not patronise these institutions so much as "male adults, and as large numbers of the former "have died, I think it must be conceded, notwithstanding the fact that personal contact "(as explained later on in this report) may "cause infection, that both these questions "should be answered in the affirmative. If not "why should not all parts of these streets be "equally affected?

"I would ask you to inspect these latrines "personally to see that my statements as to "want of use of disinfectants to the fæces are "correct. When visiting these places I have "not seen a grain of quicklime, or a drop of "carbolic acid, or any other disinfectant used to "treat the excreta, and from what I learned by "examination of attendants it is only by the "merest chance that Jeyes' Fluid ever finds its "way into the soil-pan.

"Full statistics, such as I understand Mr. May "has procured, would help very much to arrive "at an accurate result. I would suggest that "some one with a little spare time should 'plot "out' the figures of the severe plague localities "upon a map of the city, and then have the "position of the latrines inserted. This will go "to prove what I have indicated above. Of "course where so many cases have occurred in "the infected areas, it would be unwise to lay this "down as absolute, it is only suggested to me "from what I have particularly noticed to the west "of the Civil Hospital. There may be a few exceptions with regard to the spread of disease by "latrines, and some houses seemed to have escaped "in a remarkable manner, possibly owing to some "trade peculiarity, etc.; but with full statistics it "may be found that even those which apparently "have had no case have really been infected, or, "more probably still, their inhabitants had fled "before being attacked by the epidemic.

"If it is His Excellency's desire to have further details I shall furnish them if I can.

"In conclusion, please bear in mind that I do not say this is the *sole* cause of the spread of plague, it is *one* cause, and one that ought to be remedied at once in case we have another outbreak in the near future."

Further investigation in the infected area to the west of the Government Civil Hospital has fully borne this out.

EFFECT OF CLIMATIC INFLUENCE.

The disease commenced here at the end of the dry season; it had raged furiously in Canton during the dry season; and increased here after the rain set in. It was raging at Canton when the temperature was about 60° F., and in Hongkong when it was between 80° and 90° F. These facts show that at any rate between a temperature of 60° and 90° F. the epidemic will flourish, and that the humidity or dryness of the atmosphere has not much influence on its forward march. Experimentally the bacillus grows best in a slightly moist medium at the temperature of the human body, and from these experiences a humid condition of the soil and atmosphere would favour the propagation of the disease. It must be kept in mind that the great breeding ground for the germs is in the human body, a fact which is often forgotten by people who wonder how the disease is propagated and speculate as to the effect that different temperature and humidity have upon it. As a matter of fact, it follows that conditions of temperature and humidity approximating to those of the human body are favourable to the multiplication of the bacillus.

It has been suggested that the increase of the of the disease after the rainy season set in was due to the rise of subsoil water in the more or less porous ground, causing the expulsion of ground air (more or less polluted from contact with soil infected by leaking drains) through the unpaved floors of dwellings, but I lay most stress on the fact that the heavy rains drove coolies and others into the infected houses to sleep instead of sleeping in the street as they generally do in the summer when the weather is at all good.

MODE OF INFECTION.

The poison is given off in the *feces*, in the blood and in the contents of buboes. Skin to skin infection is impossible unless the one to be infected has some wound and the infector's skin has been soiled by *feces*, blood or the contents of buboes. The poison is not given off in ordinary respiration. Cultivation experiments with, and microscopic examination of, sputum and saliva have given negative results in the only case in which I have been able to work on this point. The question of whether the bacillus is present in the vomit has not yet been solved. Dr. Kitasato does not at present think so, but seeing that animals feeding on

bits of plague buboes contract the disease, I think it better to give a guarded opinion upon this point. That the bacillus may live under certain conditions in the stomach is evident; what these conditions are I cannot state, but in an unhealthy stomach with great decrease of gastric juice it is quite possible for the bacilli to live and even multiply.

Infection takes place by inoculation, inspiration, and introduction into the stomach. The latter is infrequent. In this epidemic the relative frequency of the two first mentioned channels could not be made out, and indeed it would be difficult at any time to determine, as in cases of inspiratory infection the primary bubo noticeable may be situated in any part of the body, whilst a scratch on the hand or foot which may be thought the primary wound is often an after result of an injury unimportant at incipience. Most of the coolies affected wore neither shoes nor stockings; almost all males go barefooted, which would partly account for the large number of the coolie class being affected. The better class of Chinese, though living under almost identical sanitary conditions, generally wear shoes and stockings.

Infection from bodies found in streets or houses or awaiting burial may take place if clothes, etc., have been soiled by discharges.

Infection by flies and mosquitoes is improbable, as no attendant in Hospital, although frequently bitten by these insects, was affected. No bacteriological examination of mosquitoes or flies was made.

INCUBATION.

The incubation period may extend to nine days; it is, however, generally from three to six days. How short it may be I do not know, but I should say that a few hours' incubation period is very improbable. Case I had an incubation period of between one hundred and two and one hundred and thirty-eight hours. The first batch of soldiers who were affected were seized with fever three-and-a-half, four, and six-and-a-half days respectively (after cleaning out some badly infected houses), while another soldier had an incubation period of four days. Of course these dates may be wrong as far as incubation is concerned, as they might have been infected at any time during these days, but at any rate the evidence is significant. The limit period was in the following case. A Chinaman, Man Ohoy, was arrested on June 11th and put in the Police Cells during the day. He was sentenced to imprisonment in gaol on 12th June, and on 20th June in the evening, after having complained of not being well and being under observation for two days, became feverish, and was removed to Hospital. The following day (21st) a left femoro-inguinal bubo appeared. This case gives an incubation period of nine days and is very important. There were

many cases where an incubation of between three and six days could be proved, at least so far as one can speak of proof when eliciting evidence from Chinese. The Eurasian Italian Convent Sister who died from plague had an incubation period of five days.

The matter may be summed up as follows, the incubation period is generally from three to six days, is seldom under three or over six, but may reach nine.

CLINICAL.

Before describing in detail the clinical aspects of the bubonic plague it may not be out of place to give a brief description of the condition in which we found the sufferers during the early weeks of the epidemic. In those days, very naturally, cases were discovered in a more advanced stage of the malady than later, when house-to-house visitation was well established, and hidden sufferers were less frequently found. To overpaint the pitiable surroundings associated with plague work at the commencement of the epidemic would be impossible. I have entered a long low cellar, without any window opening, and with the air entering only by a square open shaft from the level of the roof three or four stories high. Down one side of the shaft ran a broken earthenware drain pipe, leaking freely, the contents streaming down the wall of the air-shaft to a shallow pool of filth which crossed the undrained floor of earth. Although it was broad daylight outside, a lantern was necessary to see one's way. On a miserable sordid matting soaked with abominations there were four forms stretched out. One was dead, the tongue black and protruding. The next had the muscular twitchings and semi-comatose condition heralding dissolution. In searching for a bubo we found a huge mass of glands extending from Poupart's ligament to the knee joint. This patient was beyond the stage of wild delirium. Sordes covered the teeth and were visible between the parted and blackened lips. Another sufferer, a female child about 10 years old, lay in the accumulated filth of apparently two or three days, unable to speak owing to the presence of enlarged cervical glands. The fourth was wildly delirious (the conjunctivæ intensely congested) and was constantly vomiting. The attendant (*sic*)—the grandmother of the child—had a temperature of 103° F. and could only crawl from one end of the cellar to the other. She was wet through, and was herself doomed. This is no fancy sketch but a true picture of how we found some of our patients at the outbreak of the scourge in Hongkong. No one, unfamiliar with the horrors of some coolie accommodation in China, could credit "how the poor live" in Hongkong, or could imagine how the horrors of their everyday life were intensified by the plague.

The terrors of the disease itself were rendered greater by the fear the poor wretches often had

of falling into the hands of the "foreign doctors." It is no great credit to our boasted civilisation, or to our vaunted mission work, that the average intelligent Chinaman of to-day prefers the fetich tricks of the native practitioner to the more enlightened methods of graduates of the western schools; but the fact remains that the horror of western medicine is by no means confined to, though almost universal among, the members of the coolie class. So evident was this fact that it was deemed prudent to allow such sufferers as preferred their own native doctors to be attended by them in hospitals under European supervision.

Face to face with a hundred difficulties, accentuated by the natural suspicion and ignorance of the Chinese, whom as far as possible we wished to appease, naturally short handed as far as medical men were concerned (for the visitation gave us little warning and spread with alarming rapidity), the difficulties the executive had to combat were grave in the extreme.

Wisdom after the event is a proverbially cheap attribute and doubtless there are many people who possess it. We hear, now that the immediate strain and danger have passed, how very much more satisfactorily things might have been done, principally from people who did little or nothing to help us in the hour of our extremity. We hear of wisemen who knew that the plague was here many weeks before it arrived, but who kept such valuable information strictly to themselves, in the interests, doubtless, of the community. Rash and inaccurate "first thoughts" have found their way into the British journals, and crude guesses have appeared in print under the false guise of "methodised experience." It will be prudent for plague students to accept very guardedly such early lucubrations. No man who really saw the plague in its early days had time for recording in a trustworthy way its often varying phases, and at that time sound clinical record was almost impossible. Later on, in the light of a quieter time, and a more leisurely observation there was time to expunge as error that which at first was not unreasonably recorded as fact. We constantly laboured under the difficulty of not being able to speak the language of our patients, and such a condition of affairs was not only more or less alarming to them, but greatly against our treatment throughout. Of course, we had attendants who were able to interpret, but an interpreter is an unsatisfactory necessity by the sick bedside, and often helps to confuse a sufferer, whose intelligence *ab initio* is none too clear, and whose approaching delirium dissipates coherency.

The sick person may be said, roughly speaking, to present upon first being seen many varying aspects. Sometimes the patient is brought in in a condition to demand very careful diagnosis before committing him to a plague ward. There may be only general malaise with a temperature

of say 102° F., a tongue somewhat coated, an anxious, sometimes terrified, expression, a quick small pulse (more or less the result of shock and fear), and a general feeling of aching over the body. Such symptoms of course may be the result of a dozen different pathological conditions and caution is needed. Another case may have the injected conjunctivæ and high fever which forerun the stage of delirium, and here the bubo is as a rule easily found. Most cases aided diagnosis, in the first month of the visitation, by having well-marked buboes upon admission to hospital. Sometimes the conjunctivæ show marked bile staining. It will not do to accept a bubo as indisputable evidence of plague—bear in mind that lymphadenitis is not eliminated from human ills at a time when the bubonic plague is in evidence and that in lymphadenitis (associated, say, with a wound of the foot) you may get your fever, pulse, general malaise and bubo in the most common site of bubonic plague selection. One or two such cases were sent to us during the recent epidemic. Sometimes an individual may not know he is suffering at all. In one case I took the temperature of an Indian who looked ill, but who had come to see about the burial of a compatriot, and who complained of no unpleasant symptom, but was rather amused at my using the thermometer in his case. He had a temperature of 103° F. and a small cervical bubo. In the wards he had a very grave attack and only just missed joining his friend whom he had come to bury.

The facies of a plague patient has been variously described by classical writers. Shortly, it may be put down as a mixture of anxiety, cyanosis and dyspnoea until the first mentioned is overcome by the nervous symptoms; whilst the character of the gait depends solely on the state of the cerebral system.

Generally speaking, there is something indescribable in the face of the plague stricken which seems to help your diagnosis, an expression as if the sufferer himself knew all about it, and his inner consciousness had left its mark on his features.

Temperature attracts notice early. It rises, as a rule, gradually and not suddenly as it does in malaria. In most of the European cases and in the Japanese doctors, who were watched from the beginning, it took from twelve to thirty-six hours to reach the primary maximum. This primary maximum in the early part of the epidemic was generally from 104° to 106° F., a temperature of 106° F., being frequent. As time went on this seemed to fall to 105° and later still a temperature of 104° was seldom reached in the first stage. At the beginning of May the period of pyrexia due to the disease itself was somewhat longer than it was about the end of June, whilst in August it was shorter than it was in the middle of the epidemic. Secondary complications often keep up the temperature for

a fortnight or even longer after the acute stage of the disease has passed. I am now speaking of cases that recovered. In most severe cases the tendency is for the temperature to keep about the same level for some time. In milder cases a gradual (sometimes only slight) fall takes place; most recovering cases show a well marked morning fall and evening rise. The temperature may fall by lysis or crisis—the latter being very rare. Antipyretics generally affect the temperature very slightly, and in looking at some of the charts, although falls of 2° or 3° are sometimes noticed, still the majority of cases show very little fall. In some cases, where a large fall (say of four degrees) was brought about, the fall was coincident with approaching death. During the first month the highest temperature on admission was $106^{\circ} 6'$ F. The highest temperature noted in this period was in a child *æt.* 5 years on the third day, when it reached $107^{\circ} 4'$ F. During the second month our highest temperature on admission was 106° and highest reached $106^{\circ} 4'$ F., but only five or six others were noted above 105° . The highest temperature recorded in the epidemic was $108^{\circ} 8'$ in a child.

Well-marked rigor at the commencement of the disease was conspicuous by its absence, in many cases the first thing that attracted notice being the headache due to fever. Many cases complained of a slight shiver or chillness. In connection with the absence of marked rigor it is interesting to note that in Hongkong, malaria attacks have frequently no cold stage at all. Previous records of the disease make the rigor generally well marked.

The *swollen glands* that were apparent most generally affected the femoral chain in Chinese as well as in Europeans. In Chinese, infection by inoculation was frequent owing to coolies going barefooted. All the Shropshire Regiment men infected had femoral or inguinal buboes, and they were well booted; so that there must be some reason for the femoral glands being especially liable to enlargement. However, seeing that the disease often causes a general enlargement of glands, I think that the mere point as to which set of glands is usually enlarged has been made too much of; more especially considering that sometimes the biggest gland is situated in the abdomen out of sight until the *post mortem* examination is made. The pain in the bubo was very great at first; later on it became less; and finally towards the end, when no apparent swelling was noticed, it was only occasionally, on considerable pressure over some of the most generally affected regions, that what might be termed a "differential pain" was discovered. Sometimes pain was noticeable a considerable time before the enlarged gland was noticed. At the commencement of the epidemic the noticeable buboes were very large and as the epidemic went on their size gradually

diminished. Although pain and size generally went together, frequently a small gland was to be met with which would be as painful as a very large one. At the commencement of the epidemic the bubo was *always* surrounded by a considerable amount of sero-sanguineous exudation, and as time went on it was found that this diminished also, the end of the epidemic showing very few cases which had any exudation at all. Sometimes there was a very large amount of cedema around the bubo quite distinct from the sero-sanguineous exudation around, and a "doughy" feeling could be detected in the bubo during the course of the first twenty-four hours, probably due to the rapid pouring out of exudation. Femoral buboes as a rule were most painful, parotid swellings standing at the same level. Those situated in the axillary and cervical regions did not cause so much discomfort, unless in the latter region the swelling reached close to the trachea or the mastoid cells. The abdominal pain was, I consider, in some cases due to inflammation of some of the mesenteric glands. In the case of the Italian Convent sister who died this was undoubtedly the case, as the slightest pressure over a spot on the left side of the umbilicus caused great pain, and immediately under this spot the only well-marked enlarged gland in the abdomen was found at the *post mortem* examination. This is interesting when one considers the question of sensibility of the peritoneum.

The bubo when present generally appeared within 24 hours of the onset of the fever. In two or three cases we got a history of the bubo appearing before the fever, but as a thermometer had not been used I place some doubt on the accuracy of the statements made. In numbers of cases the swelling did not appear till later, in one case not till about the ninth day of the disease, when the temperature suddenly dropped, and the case became rapidly convalescent. In another case it appeared on the sixth day and the disease still continued to run an acute course. In a few cases, where a small bubo was present for four or five days, a sudden enlargement was noticed and the patients rapidly sank. This was especially marked in three cases with cervical buboes. I ascribed this mostly to the sudden extension of the swelling to the larynx. From the rapid way in which the pulse and respiration became worse in these cases, however, it is quite possible that interference with the pneumo-gastric and phrenic nerves may have been the immediate causes of bringing about a suddenly fatal issue. I formed the opinion that a sudden enlargement of a bubo, after having been practically stationary for some time, is of grave portent.

Sometimes a whole chain of glands was enlarged; when this was so, if the patient survived, widespread sloughing was to be anticipated later. On two or three occasions on the *post mortem* table a large hæmorrhagic mass of glands was found running from the apex of

Scarpa's triangle to the bifurcation of the abdominal aorta. The question as to whether the bubo was a true suppurating one was raised, one medical man being of opinion that an opening, (although made on account of supposed suppuration), was made too soon, and that suppuration was the result of incision. This had to be disproved more or less to his satisfaction. The Chinese Hospital (Slaughter House) contained patients on whom a knife was never used,—one morning we counted 43 patients there. Of these 34 had buboes that had suppurated and burst of their own accord, some of them having caused serious sloughing. An immediate small rise in temperature often followed the incision of a gland, even when pus was evacuated.

Cerebral symptoms appeared early in the disease. They were due to two causes principally (a) meningitis, (b) hæmorrhages. Headache began with the fever. It was generally fronto-temporal and most severe in the early cases. I may say here that all symptoms of the disease seemed to be more acute at the beginning of the epidemic than they were later. The headache was generally a combination of an acute dull pain accompanied by throbbing in the temples. Sometimes (rarely) a patient complained of occipital headache and, on one or two occasions, of pain in the back of the neck—evidently of spinal origin. The headache gradually merged into delirium as the meningitis developed. Convergent strabismus or divergent strabismus was occasionally present—generally the former. "Both eyes turned to right or left" was also noticed in some cases. Occasionally where hæmorrhage was diagnosed the pupils were unequal, but in one conspicuous case where a hæmorrhage on one side of the brain was supposed to exist (diagnosis concurred in by Professor Aoyama), no hæmorrhage was found and I think that in many cases the mere meningeal inflammation caused symptoms which would lead one to suppose that a one-sided lesion was present. Cases generally developed brain symptoms which could be differentiated into four distinct types:—

- (a) Comatose, where the patient lay practically paralysed, mind and body.
- (b) Wildly delirious, where he struggled and fought and still retained a fair command of rational speech.
- (c) Apathetic, where he lay perfectly quite, and took nourishment when it was offered to him; in fact lay in a drowsy, but always more or less conscious, condition until improvement or death took place.
- (d) A convulsive type brought on either by the inflammation of the meninges and brain matter or by a hæmorrhage. These convulsions were often severe. (In Case I they were only stopped by chloroform. *Post-mortem* no hæmorrhage was found.)

In Case XV they always began in the left arm (hand) and were truly Jacksonian in nature, pointing to some cortical lesion round the right fissure of Rolando. (See remarks on case.) Occasionally they resembled tetanus, the opisthotonos being very great. *Subsultus tendinum* did not occur early as a rule, but generally late in the disease. Picking at the bed clothes, trying to catch imaginary objects, in fact all the symptoms of meningitis were almost always present; in a few cases, however, they were absent, and such cases were usually of a very mild nature. Patients often had hallucinations beginning generally on the second day of the illness. All these cerebral symptoms followed the primary lymphatic affection and their rapid appearance was not to be wondered at when one considers the close connection between the arachnoid and the lymphatic system.

The vascular is the other system which was especially affected. The principal items to note were—

- (1) The vasomotor paralysis which rapidly appeared involving the heart itself as well as the vessels.
- (2) The liability to sudden heart failure.
- (3) The symptoms probably due to organic changes in the heart in those who recovered.

There are four stages of the pulse in plague. During the first stage it is in the majority of cases full and bounding. In some it is feeble and collapsed. When in the latter state cyanosis is usually well marked and the patient is evidently moribund. The pulse which at first is full and bounding becomes (usually in from six to thirty-six hours) dicrotic and fairly easily compressible at the wrist.

Intermittency is often noticeable in this second stage of the pulse and becomes more marked as the third stage develops, when it becomes anacrotic and almost like the pulse of aortic insufficiency, there being no rebound wave at all, nor the slightest trace of it by sphygmograph in a well-marked case. In addition it is at this period very easily compressible, and the actual range of movement of the vessel is very limited at the wrist, whereas in the larger vessels the upheaval is usually well marked, slight pressure at the femoral being sufficient to arrest the pulse.

This patient was a very lean man, and consequently a tracing of this femoral pulse could be easily obtained as the vessel passed over the brim of the pelvis.

From this anacrotic stage gradual or sudden failure may set in, unless there is a general improvement in the case. The pulse generally becomes fast and running and scarcely perceptible or if perceptible it is generally intermittent.

On the second day if a thin patient was naked one could usually see the femoral arteries beating at a distance of several yards, and this was equally true of the other large arteries. Often this large movement was to be seen in the vessels in the neck, axilla, or groin, and yet at the radial or posterior tibial arteries the pulse was hardly perceptible.

These four stages of the pulse (1) full and bounding, (2) dicrotic, (3) anacrotic, (4) failure, may be looked upon as the usual sequence; though one or more of them may under some circumstances escape observation. They may all be of the shortest duration, and of course sudden heart failure may at any time prevent the later stages developing.

The area of cardiac dulness was generally enlarged early in the disease (apex downwards and to the left of usual position) and sometimes remained so for weeks in those who recovered, there being also an increase of dulness on the right side. There was practically no muffling of the sounds. These conditions pointed to dilatation, yet murmurs were of rare occurrence. One would have expected to hear them more frequently even in those who were long sick and recovered. The first sound was invariably weak in the later stages. Pain in the cardiac region was generally complained of. These symptoms pointed to a true myocarditis. Palpitation was frequently present and complained of. A pericardial rub I never heard, although in a few cases *post mortem* a small accumulation of fluid was found in the pericardium. I think that the tendency to hæmorrhage must have been caused by some inflammatory or fatty degenerative change in the small vessels, and this may be one of the reasons why digitalis was so frequently a failure. It is to be expected that the microscopic pathology of the disease will be written by Aoyama at some future time.

When blood was drawn from the finger tip it was found to flow more easily and to look more fluid than normal. When put under the microscope it was found that the corpuscles crenated rapidly, and did not run into rouleaux readily. The number of leucocytes increased always when the disease was at its height, and in the later stages there were occasionally to be found broken down or badly formed corpuscles. The number of red corpuscles was not materially diminished until the 7th-10th day when convalescence was setting in. The amount of hæmoglobin in the blood commenced to diminish from the second day of the disease, and, in some cases, became very low. In Case I, it was as low as 18% of the normal quantity, but in this case the patient was always somewhat anæmic. A diminution to 30% was frequent. The bacteriological examination of the blood will be discussed later.

Digestive System.—The important symptoms in connection with this system are—(i) condition of mouth and fauces; (ii) vomiting; (iii) diarrhoea or constipation. The mouths of Chinese patients were invariably dry from the commencement, and the teeth and lips were early covered with sordes. The tongue was at the beginning of the attack almost covered with a thin white fur which became thicker, and then went through a transformation from white to black. In the early stages it was very like a typhoid fever tongue—white fur with red edges and tip,—but in plague there was little or no tailing off of the fur as it approaches the edges, and the edges were not of such a bright colour as is generally the case in enteric fever. As the disease advances the fur changes from white to yellow and brown, dark-brown and black. The latter colour is confined to the middle part of the organ, toning down towards the edges, which still retain their original colour, in fact like a heavy tobacco chewer's tongue dried up. The edges get somewhat redder as the disease goes on. The tongue is protruded with difficulty, the cause of this evidently being the cerebral condition, or possibly pain in the cervical glands. In Europeans, tongue conditions were never marked, owing to nourishment being taken often, and to the frequent use of the toothbrush. In the opinion of some people the dry condition of the mouth was the cause of the tongue not being easily protruded, but I consider this is a very minor cause. The fauces and pharynx were generally somewhat injected, and the tonsils somewhat swollen. When the principal bubo was situated in the cervical region, (especially if affecting the anterior cervical glands,) the tonsils and pharynx were usually intensely congested from the spread of the glandular inflammation.

Vomiting usually came on early and was of a bilious nature, being at first greenish, but going on to a dark-brown colour, almost grumous. Hæmatemesis was exceedingly rare during the epidemic. The question arises whether the dark grumous material vomited was not blood altered by stomachic causes. I do not think that this is so because in these cases (if efficient treatment was not adopted), the vomiting was sometimes constant, and pure or almost pure blood would necessarily have been vomited much more frequently. The vomit was generally of the same colour as the bile found in the gall-bladder *post-mortem*. The vomiting generally disappeared after counter irritation and a dose of calomel had been administered, and a free evacuation of the bowels secured. Where calomel was given early this troublesome symptom very seldom appeared. Under the care of native doctors vomiting was much more frequent than in our hospitals, and this I ascribe to want of purging, and also to the horrible concoctions of medicines and food which they forced down their patients' throats. Considering the cerebral con-

dition of some patients it was to be expected that vomiting and retching would be frequently met with; but after the above explanation and taking into consideration the fact that the vomiting did not show the ordinary cerebral characteristics, I think that this symptom must be put down as mainly due to the condition of the liver and bowels. The feeling of oppression, and sometimes burning, in the epigastrium was due partly to the stomach trouble, but mainly, I believe, to cardiac conditions. Hiccough was often distressing, but the first dose of morphia generally stopped it.

Constipation was the general rule, though diarrhoea was met with in a number of cases and might be classed as (a) slight looseness of the bowels; (b) severe diarrhoea. Many cases of slight diarrhoea did very well, in fact I put it down as a favourable symptom, but then it only appeared in what seemed to be milder cases. Severe diarrhoea need not necessarily be a bad symptom. As a rule when severe it was very fetid and evidently due to an acute enteritis. There was sometimes considerable straining with it resembling dysentery, but in only one case in the epidemic in our hospitals did I see blood in the evacuations, and then it was dark in colour, no bright blood as is often found in dysentery, and had evidently come from some distance up the bowel. Pain over the liver was never complained of, pain over the spleen on a few occasions only; pain in the abdomen was due possibly to one or more swollen glands, or may be ascribed to colic, or frequently to distension of the bladder. Enlargement of liver and spleen was only occasionally made out by palpation and percussion.

Respiratory System.—Dyspnoea was a constant symptom and was due to a combination of causes:—(a) œdema of the lungs brought on by the vasomotor paralysis and possible changes in the small vessels; (b) the febrile state, and loss of hæmoglobin; (c) cardiac. It was of an anxious and distressing character, coming on early in the disease with rapidity of respiration; the *alæ nasi*, however, were soon at work and the respiration became more rapid still. The dyspnoea was more of a pneumonic than of an asphyxiative type. Physical signs of hypostatic mischief were seldom well marked before the third day of illness, and even then was only so in the severe cases. Some cases got well in whose lungs no moist sound was ever heard, but I am bound to add that many a one died with precisely the same condition of affairs, *post mortem* examination always showing some congestion at the bases of the lungs. Cough was generally absent in the early stages of the disease; or if present was evidently caused by the œdema of the lungs, and was then of a short and irritating character. Many cases showed œdema of the lungs without cough. These were generally rapidly fatal, the patient becoming comatose as the lungs became choked up. In a few cases the œdema went on to acute pneumonia and pleurisy, but this as a

rule was only seen late in the disease. Pleural effusion was seldom marked enough to diagnose before death. In some cases multiple pneumonic abscesses—undiagnosed—occurred.

(To be continued.)

AN ACCOUNT OF THE PRODUCTION OF VACCINE IN INDIA BY PASSING SMALL-POX VIRUS THROUGH THE CALF.

By W. J. SIMPSON, M.D. M.R.C.P.

(Continued from Vol. XXXI, page 447.)

6TH DAY.

March 15th, 119 hours.—The vesicles on udder have unfortunately got rubbed. There are now two other vesicles (Nos. 6 & 7) on left thigh at seat of one puncture. There is also a papule in middle of left thigh.

Temperature of calf— 98°

121 hours.—Perfectly clear lymph taken from 1, 5, 6 and 7 and inserted into the left arm of Bunwari, a male child, aged 1 year, in two places; also into calf X.

126 hours.—The vesicles on the udder show a flattened centre around which is a pearly white ring. The vesicles possess a hardened base, and around each of them is an angry-looking red circle. There is nothing particular about the inoculation done on abdomen on March 12th.

Dr. Crombie, Superintendent of the General Hospital, Calcutta, and Dr. Birch, Principal of the Medical College, examined the calf and expressed the opinion that the vesicles had all the appearance of vaccine vesicles in an early stage.

7TH DAY.

March 16th, 143 hours.—Two of the vesicles on the udder are circular and cup-shaped in the centre with raised pearly-white rings and hardened bases which are slightly pinkish and not angry-looking as yesterday. The others are more irregular in shape, but present the same appearance and are at the same stage of development. They are exactly like vaccine vesicles of the 7th day on the calf after being rubbed.

Temperature of calf— 102°

One of the insertions on the abdomen made on the 12th March from vesicle No. 1, calf I, has developed into a well-raised vesicle, contains lymph. There is also what appears to be a secondary papule about an inch away from this vesicle.

On the left thigh the papule of yesterday has become a raised acuminate vesicle.

152 hours.—All the vesicles more advanced this evening, each possessing a clear pearly glistening ring and presenting appearances exactly typical of vaccine vesicles on calf or child.

Dr. Mackenzie, Police Surgeon to Calcutta and Superintendent to the Campbell Hospital in Calcutta, to which the Small-pox Wards of the town are attached, inspected the vesicles and was quite satisfied as to their vaccinal nature.

Inoculated with the lymph from the udder two calves, viz., calf XI, also calf XII, and a male child aged 1 year, named Rukmini.

8TH DAY.

March 17th, 167 hours.—The vesicle No. 9 mentioned yesterday has become still more developed. The papule referred to is still a papule. This appears to be the only secondary papule that has appeared in this calf, for it is doubtful whether the papule becoming No. 8 vesicle did not arise at the seat of a puncture

Temperature of calf— 102°

9TH DAY.

March 18th, 191 hours.—Crusts forming at seats of original vesicles.

Temperature of calf— 103°

11TH DAY.

March 20th, 241 hours.—Crusts drying up.

Temperature of calf— 104·2°

12TH DAY.

March 21st, 261 hours.—Crusts drying. One crust removed for examination.

Temperature of calf— 102°

267 hours.—Vaccinated with ordinary calf vaccine, 6th day lymph. This operation proved unsuccessful.

Thus it is that of the 5 inoculations on the udder from vesicles 1, 2 and 3, which were apparently secondary vesicles, all were successful. Of those inoculations on the right thigh from the vesicles on abdomen none were successful. Of those on the left thigh from primary vesicle No. 4, two were successful. One other vesicle also appeared on this thigh, it being doubtful whether of a secondary or primary nature; and of the later inoculation from secondary vesicle No. 3 one was successful. All these arrived at maturity much earlier than in calf I.

Inoculations made from Calf V.

As previously stated, three calves and two children were inoculated with lymph from calf V.

The calves were X, XI and XII, and the children were Bunwari and Rukmini. The operation on all three calves was successful, but more so in calves X and XII than in XI. All three calves were afterwards vaccinated but without success. As the lymph belonging to calves X and XI was not transmitted, the details connected with them is not included in this description.

Details regarding Calf XII.

Calf XII was a white male, aged 2 years, possessing a soft skin, and the following are the notes connected with the transmission of lymph to it from calf V. The lymph was 7th day lymph, i.e., 154 hours after inoculation:—

1ST DAY.

March 16th.—Five punctures on each thigh, 4 punctures on scrotum, 4 incisions on abdomen.

Temperature of calf— 100°

2ND DAY.

March 17th, 15 hours.—Nothing to note.

Temperature of calf— 99°4'

3RD DAY.

March 18th, 39 hours.—The incisions and punctures look favourable.

Temperature of calf— 99°

4TH DAY.

March 19th, 63 hours.—Much the same.

Temperature of calf— 99°

5TH DAY.

March 20th, 90 hours.—Nothing further to note.

6TH DAY.

March 21st, 114 hours.—Taking very nicely, 8 of the insertions have become vesicles which are well raised and very characteristic. Lymph transferred to calf XVIII.

7TH DAY.

March 22nd, 139 hours.—A fresh crop of 5 vesicles have appeared at the other seats of the insertion of the lymph.

8TH DAY.

March 23rd, 165 hours.—Transferred lymph to calf XX.

In both calves XVIII and XX vesicles arose. The lymph of calf XX was not further transmitted, as the animal was attacked with fever and cystitis. Both calves were vaccinated afterwards without success.

Details regarding Calf XVIII.

Calf XVIII was an ash-coloured male, aged 1½ years, and the following are the notes connected with transmission of lymph to it from calf XII. The age of the lymph was 118 hours, *i.e.*, 6th day lymph.

1ST DAY.

March 21st.—Fifteen incisions were made on abdomen, 29 punctures were made on different parts of abdomen and thigh.

4TH DAY.

March 24th, 69 hours.—Well-raised papules on a reddish base at seats of punctures. The incisions are also raised with an inflammatory blush around them.

5TH DAY.

March 25th, 93 hours.—Some of the papules of yesterday have developed into vesicles. The incisions are developing.

6TH DAY.

March 26th, 117 hours.—Punctures and incisions have taken excellently; well-raised vesicles have formed. Inoculated with the lymph, calves XXIV and XV, also two children—Soripphon (No. XIV), and Fakirchand (No. XV).

N.B.—Good vesicles were raised on the children and the calves.

7TH DAY.

March 27th, 137 hours.—Vesicles well raised areola not yet formed. Slight red blush around the vesicles, but no hardness.

8TH DAY.

March 28th, 161 hours.—Vesicles becoming cloudy. Only three incisions remaining in a clear vesicular condition.

9TH DAY.

There is no need of going further in this *bovine series* derived from calf I and calf V. It may be mentioned, however, that lymph was transferred from calf XXV to a child, and from this child to four children, and from two of these to calf XXXVI. From this calf transmissions have been carried on up to the present time of writing.

CHILDREN INOCULATED FROM CALVES I AND V.

The two children, Bunwari and Rukmini, were inoculated with lymph from calf V, on March 15th and 16th, respectively. Bunwari was also inoculated with lymph from calf I, but the operation was unsuccessful.

BUNWARI INOCULATED WITH LYMPH FROM CALVES I AND V.

1ST DAY.

(Child No. 1). Bunwari, male, aged 1 year.

March 15th, temperature of child 98°.

(a) From secondary vesicle No. 7 of calf I, lymph taken and inoculated into *right* arm in two places.

(b) From vesicles on udder of calf V, lymph taken and inoculated into *left* arm in two places.

4TH DAY.

March 18th, 71 hours.—The seats of inoculation on the *left* arm have taken, being in a papulo-vesicular state. The points of inoculation on the *right* arm appear to be drying up. The child has had ophthalmia for the last two days. This disease has been prevalent in the family for some time past and is also prevalent in the neighbourhood in which the child lives.

5TH DAY.

March 19th, 95 hours.—Well-raised vesicles have formed on the left arm at the two places of insertion. The punctures on the right arm have dried up. Dr. Grogg, the Sanitary Commissioner of Bengal, inspected the child's arm to-day. He was also present when two children, Buddia No. I and Buddia No. II, were inoculated with the lymph from one of the vesicles on Bunwari's arm.

Temperature of child—

98°

6TH DAY.

March 20th, 123 hours.—The unbroken vesicle is exactly typical of a good vaccine vesicle ; no areola has yet formed.

Temperature of child— 98·8°

125 hours.— Dr. Crombie and Dr. Mildred Staley saw the vesicles to-day and were satisfied as to their being exactly similar in appearance to vaccine vesicles. Lymph was taken from the untouched vesicle and inserted into child No. 6, named DeCruze.

9TH DAY.

March 23rd, 196 hours.—The vesicles have enlarged. There is a well-marked areola around them. The base of each is hard. The axillary glands are not affected. Dr. Mackenzie inspected the vesicles on the child's arm, and was satisfied as to their vaccinal nature.

Temperature of child— Morning 100°
Evening 100·4°

10TH DAY.

March 24th, 220 hours.—No eruption of any kind on body. Pustules forming into scabs.

Temperature of child— Morning 100·3°
Evening 101·0°

11TH DAY.

March 25th, 244 hours.—Pustules are drying up. Crusts are forming, each about 5 lines in diameter. The areola and hardened base of each vesicle have coalesced owing to the two points of inoculation being side by side.

Temperature of child— Morning 100·4°

The area of the whole areola and the hardened base around both pustules has a diameter of about 1½ inches. The axillary glands on the affected side are slightly enlarged. Child is quite lively. There are no signs of rash or of any eruption. The skin is remarkably free of the slightest pimple.

14TH DAY.

March 28th, 316 hours.—Crusts drying up. The child has still ophthalmia, which keeps up the temperature. No eruption of any kind noticed on the body. Dr. Gregg inspected the child to-day and was satisfied of no eruption.

Temperature of child— Morning 100·6°
Evening 99°

15TH DAY.

March 29th, 340 hours.—Crusts drying. No eruption. Dr. Crombie and Dr. Forsyth examined the child to-day and were satisfied that there was no eruption.

Temperature of child— Morning 99·5°

17TH DAY.

March 31st, 388 hours.—The original crusts have fallen off and secondary crusts are forming at the seats of inoculation. No eruption. Child perfectly well. Seen and inspected by Dr. Gregg.

Temperature of child— 98°

30TH DAY.

April 13th.—Child shown to the members of the Calcutta Medical Society at their Monthly Meeting on April 13th.

HISTORY OF BUDDIA NO. I AND BUDDIA NO. II INOCULATED FROM BUNWARI.

March 19th.—Buddia No. I (child No. 3), a female, aged 1 year and 2 months, was operated on with 5th day (95 hours) lymph from Bunwari (child No. 1) in presence of Dr. Gregg. Two insertions were made on each arm.

5TH DAY.

March 23rd, 90 hours.—Well-raised vesicles at the four seats of insertion. Temperature 98° Seen by Dr. Mackenzie.

Temperature— Evening 99·2°

6TH DAY.

March 24th, 120 hours.—Three vesicles very typical. One on the left arm appears slightly raised into a bleb.

Temperature— Morning 98·5°

7TH DAY.

At 126 hours.—Some lymph transferred to calf XXI.

Note.—Was successful.

March 25th, 148 hours.—All the vesicles are well developed, and exactly characteristic of vaccine vesicles of the 7th day. Lymph transferred to a child, Shew.

Note.—Was successful.

10TH DAY.

March 28th.—A few mosquito eruptions on the back. Pustules drying with a black crust upon them. Base of pustules still hard. Child quite lively.

Temperature— Morning 99°
Evening 100°

11TH DAY.

March 29th.—No eruption ; crusts drying up.

13TH DAY.

March 31st.—All the crusts have been rubbed off, leaving raw surfaces.

26TH DAY.

April 13th.—Shown to the members of the Calcutta Medical Society.

March 19th.—Buddia No. II (child No. 4), aged 1 year and 4 months, had 5th day (or 95 hours) lymph inserted into two places on its left arm in presence of Dr. Gregg.

3RD DAY.

March 21st, 48 hours.—Seats of vaccination seem to have taken.

5TH DAY.

March 23rd, 96 hours—Well-raised vesicles have formed at the two seats of inoculation. Seen by Dr. Mackenzie.

Temperature— Evening 99°

105 hours.—Two children, Nerobala (child No. 8), and Rukmini (child No. 9), inoculated.

Note.—Both successful. From Rukmini comes down to the present time an unbroken line of transmission through children.

6TH DAY.

March 24th.—Vesicles more advanced. One slightly rubbed.

Temperature— Morning 99·1°
Evening 100°

7TH DAY.

March 25th.—Vesicles well developed; large plump, and firm. Areolas beginning to form. Base not yet hardened. Appearances quite characteristic of an ordinary vaccine vesicle on the 7th day.

8TH DAY.

March 26th.—Pustules surrounded with well-marked areola.

9TH DAY.

March 27th.—An eruption resembling vaccinia rolcola has appeared on the back and legs. Pustules forming crusts; one of them has got rubbed.

Temperature— Morning 98·5°

10TH DAY.

March 28th.—Arcola well marked. Pustules with hardened bases; measly-looking rash on back and legs less marked than yesterday.

Temperature— Morning 102°
Evening 100·4°

11TH DAY.

March 29th.—Rash fading.

Temperature— Morning 99°.

13TH DAY.

March 31st.—No eruption noticed. Areola round pustules fading. Large black crusts still adhering.

Temperature— Morning 100·4°

Seen daily and temperature taken.

26TH DAY.

April 13th.—Shown at the Calcutta Medical Society.

The direct descent from Rukmini is shown for 13 generations in Table A in appendix.

It will be seen from the summary that from March 1892 to February 1894, 420 children had been operated on, and of this number only two were unsuccessful and three doubtful. The success rate was unusually high, and it was remarked that the vesicles continued throughout to possess an excellent appearance.

(To be continued.)

A Mirror of Hospital Practice.

IMPERFORATE HYMEN AND RETAINED MENSES.

BY SURGN.-LIEUT.-COL. H. P. ESMOND-WHITE, F.R.C.S.,
Durbar Physician.

THE following is interesting as more often heard of than seen:—

Narayani, a Hindu, aged 18, had never menstruated. During last two years had abdominal and pelvic pains; she noticed a tumour gradually increasing in size in her abdomen. On examining her a tumour was found reaching from pubis to near costal arch, hymen thick and imperforate and bulging. Under chloroform an incision was made, and fluid to my mind resembling coffee but a little lighter in colour was let out; 4½ pounds was collected.

The vagina was pushed up to the rectum and uterus, and the bladder compressed. Two days after operation a sound passed five inches into uterus showing it had been considerably distended and dilated by the pressure of fluid. The parts were freely disinfected, and a quick recovery resulted.

OVARIOTOMY.

THE following is interesting owing to the age of the woman and rapid recovery:—

Oomaroo, a Hindu, aged 55, mother of five children, emaciated, abdominal veins very much enlarged, disease of five years' duration, cysts 40½ inches.

Operated on in usual manner with antiseptic precautions as far as possible. Considerable adhesion and several hard cysts attached to large one. Incision had to be extended above umbilicus, and some force was required to get out the cysts. They contained a thick gelatinous fluid, and it was better not to evacuate the contents; 22½lbs of fluid were drawn off from main cyst. The woman, who was probably considerably over 55 years of age, nearly died on the table. Some blood was left in abdominal cavity, and a glass tube put in. Notwithstanding her age and severity of operation she made a perfect recovery; her temperature being 100° on evening of operation, and normal from third day.

THE STANDARD.

A Scottish Life Office of 70 years' standing, and one of the wealthiest and most progressive of the Provident Institutions of the United Kingdom.

DOUGLAS STEWART,

Secretary,

Standard Buildings, Dalhousie Square,

CALCUTTA.

Indian Medical Gazette.

JANUARY 1897.

ARYAN MEDICAL SCIENCE.

THE country of the Ancient Aryan Race has been called by the Thakore Sahab of Gondal in his recently published "Short History of Aryan Medical Science" the cradle of learning for the whole world, and not without much evidence to shew that such is the case. Observations on astronomy made by this race, 3,000 years before Christ, says the author, are stated by distinguished and modern astronomers to be still extant, while Geometry and Trigonometry are claimed as their discoveries. Pythagoras, it is said, has received credit for the discovery of mathematical truths which properly belongs to these Ancient Hindoos to whom also we are indebted to a large extent for the knowledge we now possess of chemistry, grammar, lexicography, music, architecture, the art of war, law and philosophy.

The early civilisation of the Hindoos, dealt with in the first chapter of the work under consideration, is full of historically interesting details, while the following chapter on "Ancient writers on Hindoo Medicine" shews that they possessed considerable knowledge of medical subjects, however much our ideas regarding most of them have changed in modern times, and no member of the medical profession, whether in Western or Eastern countries can be truly said to possess a sound education, who has not acquired at least a fair knowledge of the history and progress of medical science throughout the world, and more especially so far as concerns the country which he selects as a field for practice. The Hindoo theory of creation as stated is

interesting, so far as it shews the utter inexplicability of this momentous question, and in view of the flood of light thrown by embryological science on the subject of the physiology of conception and animal development the notions and theories which seem to have prevailed in those days were to say the least far wide of the mark.

At any rate our knowledge of the subject is sufficiently advanced to enable us to deny the possibility of a woman, uniting with another woman in sexual embrace, and begetting a boneless foetus, or that a woman may become pregnant by the influence of dreaming.

Hindoo practice during nubility or the menstrual epoch, and the rules laid down for observance under certain conditions and circumstances while absurd to a large extent are in many respects similar to those adopted by a very large portion of the female population in European countries on the recommendation of the village midwife. To the Aryan mind, the determination of the sex of the infant in utero by subjective and objective signs was a comparatively easy matter. Twins were believed to result by the semen virile being divided by local winds. The diagnosis of twin pregnancy so far as stated was correct, but the physical signs by which an impotent was diagnosed would certainly not be considered sufficient for an expression of opinion by a modern doctor with any regard for a reputation as a careful and accurate diagnostician, nor do we think any member of the profession now-a-days capable of believing that the period of gestation could possibly extend even in exceptional cases to the twelfth month.

The chapter devoted to a discussion of the principles of hygiene, as understood by the Hindoos, explains the origin of the habits and customs of the natives of India at the present time; as for example, the method of cleansing the teeth, the scraping of the tongue, the anointing of the body with oil, daily ablutions, and the consumption of *pan* which is described as astringent, exhilarant, aromatic, stimulant, carminative, aphrodisiac, "light" and heating. Marital relation was regarded as the fulfilment of a religious and not a social obligation under the belief that for one dying without a son there was no salvation. So strong was the belief rooted in the

minds of the Aryan race that remedies were prescribed for cases of disability to begot children, special importance being attached to posture as facilitating impregnation and curing internal disorders. The author draws special attention to this point with reference to the treatment of many gynaecological cases by the postural method in modern times.

Derangements in the three principal humors of the body, *viz.*, the vata, pitta, and kafa or wind, bile, and phlegm were believed to account for all morbid affections, and evidence has been adduced to prove that the circulation of the blood was not unknown to Aryans long before Harvey made his discovery in 1628. That they possessed some anatomical knowledge, although of an imperfect and crude description is undeniable, and that Hippocrates borrowed his theory from Hindoos, and that the same theory has retained its hold on the Medical Schools of Europe for more than 2000 years seems, in the opinion of the author, highly probable.

The ætiology, diagnosis and treatment of disease by these ancient physicians, if not so perfect and trustworthy as in modern days shews at least the foundation on which our present knowledge of the subject has been built. Sushruta was of opinion that all diseases were due to one or other of seven causes, but a later writer, Harita, attributed all morbid affections to Karma (good or evil deeds), derangements in the humors, or both. While we do not believe that the murderer of a Brahman will suffer from anæmia, a cow-killer from leprosy, a regicide from consumption, and a murderer in general from diarrhoea, or that cheats, abortionists, adulterers, drunkards, incendiaries, etc., will necessarily suffer from diseases, there remains the fact all the same that violation of physical, moral, and physiological laws inevitably mete out their own punishment. By the Aryan physicians inspection, palpation, percussion, auscultation, olfaction and degustation were all considered of great value in diagnosis which shews that they must have been acute observers. As therapeutical agents magic, amulets and mystic letters were much resorted to, nor are we surprised when we consider to what a large extent the present generation believe in the virtue of similar reput-

ed cures lauded to the skies by interested parties. Omens, dreams, astrology, and the like are not now generally believed to, in any way, affect the course of disease for the destinies of mankind, but that these were regarded, by the Aryan physicians as important in prognosis is evident. The rules for regulating the conduct of physicians in those days are commendable, and would, if generally observed, considerably increase the honour and dignity of the profession in our own times.

A study of the materia medica of these ancient physicians would probably shew that many of the drugs used by them which have fallen into disuse, possess the properties claimed for them. It is not evident, however, from a perusal of their writings in what manner most of the remedies employed or recommended effected a cure of the ailments against which they were directed, nor is it easy to believe that many of the medicines of animal origin used by them could have had the smallest effect one way or another.

Charaka thought fifty groups of ten herbs each enough for the purposes of an ordinary physician, but added that the number of groups could be increased to any extent. Sashruta arranged 760 herbs in thirty-seven sets according to some common properties. Besides herbs, simple medicines are said to have been obtained from the animal kingdom, *e.g.*, bone, tooth, milk, the venom of snakes, skin, cobwebs, leeches, living bed-bugs and flies, hair, the secretion that flows from an elephant's temple when in rut, honey, wax, flesh, urine, pearls, nail, feathers, cow-dung, the droppings of the domestic cock and of a goat, etc., all of which are said to have been used in the treatment of disease, and any one acquainted with the modes of treatment adopted by Baidyas at the present time specially in mofussil villages and even recommended by intelligent laymen and native physicians can have no difficulty in accepting the statement.

Not only so. Mineral drugs were also extensively employed by the Aryan physicians. Mercury so much used now-a-days in certain specific affections was recognised in those days as the most important mineral, and to which in a pure form was ascribed the virtue of curing

eighteen kinds of leprosy, eye diseases, fevers and impotency, and credited with the power of prolonging life.

The rise and fall of surgery, and the vicissitudes of Indian medicine and surgery have been freely discussed, while the concluding remarks are devoted to an earnest appeal to all seekers after truth, Europeans or Hindoos, to give an unbiassed study to Aryan Medical Science which the author says is almost dying for want of nourishment.

Sir B. H. Bhagvat Singh Jee is to be congratulated on having supplied a carefully written and instructive short history of Aryan Medical Science which in our opinion would form a valuable and useful addition to any medical man's library.

THE MEDICAL BOARD AND PLAGUE IN CALCUTTA.

As will be seen in our columns the Medical Board have decided there was no evidence to show that any cases of plague have occurred in Calcutta. They base this decision on clinical and bacteriological grounds, and state that the cases reported as bubonic plague proved on investigation to be either ordinary non-venereal buboes or cases of simple enlarged glands, fever, and bronchitis and intestinal obstruction!!

The fatal case in Raja Rajbultub Street is included in one of these classes, but it does not appear to which class the Medical Board assigns it. The history of this case is as follows:—The young man who was apparently in the best of health was suddenly seized on the 1st November with an attack of fever and headache accompanied with excruciating pain and enlargement of the glands in the right groin. The pain in the groin was so severe that he could not straighten his leg. The symptoms increased in severity, and on the afternoon of November 2nd he became insensible, when his temperature was found to be 104°. On the evening of November 3rd he died, having been in a state of profound coma for over 24 hours. The symptoms which presented themselves when Doctors Cobb, Simpson and Mittra saw the case were as follows:—The patient was lying insensible breathing with a sighing and moaning noise, the eyes were sunken

very much and congested. The pupils were contracted and insensible to light. The pulse was 160 and respirations 32 per minute. The body, especially the head, face and legs, was covered with a profuse perspiration. Petechiæ in large numbers were to be seen on the chest and abdomen and a few on the back, arms and legs. They varied in size from $\frac{1}{16}$ to $\frac{1}{4}$ inch in diameter. Both the inguinal and femoral chains of lymphatic glands in the right groin were enlarged, 2 of the former and 3 of the latter were felt to be swollen. Blood was taken from the enlarged femoral gland and from the median basilic vein for microscopic examination and for the purpose of making cultures. The blood specimens shewed diplo-bacteria identical in every respect with those obtained from Bombay, and on cultivation behaved in the same way as the plague bacillus.

The Medical Board reject the diagnosis of plague and state, from inquiries which they made, after the event "that it was clear that other reasons existed for the enlargement of the glands in the groin which was reported to be one of the prominent features of the case."

This appears to us an extraordinary conclusion in the face of the facts above cited and which were reported to the Medical Board. All the classical symptoms of plague presented themselves on the patient,—the high fever, the enlarged and painful glands, the petechiæ, and the rapid death with characteristic micro-organism in the blood were all present.

With regard to the bacteriological side of the question, all we can say is that the reported contamination do not exist in the cultures in Dr. Simpson's laboratory. We understand that the Bacteriologist to the Board was invited to inspect these cultures, but did not avail himself of the invitation.

The term "ordinary non-venereal buboes," which the Board adopts for this glandular sickness, it must be admitted, is rather vague, and gives no information as to the cause of the disease. Previous to the prevalence of glandular swellings in the men of the Shropshire Regiment which the medical officers had attributed to an unknown cause, and the occurrence of buboes in the groins and armpits of children, which are

neither the result of peripheral irritation or the scrofulous diathesis we have not heard much of "ordinary non-venereal buboes," and in the experience of medical practitioners "ordinary non-venereal buboes" among the people of this part of India is only a recent occurrence and is spoken of as a new disease. True the Medical Board refers to an article recently published in the *British Medical Journal* on the non-venereal bubo by Fleet Surgeon Godding, but they have omitted to state the very important fact that the examples given by the author of the paper are among seamen admitted into the Hospital at Hongkong where plague has been prevalent and still exists in a sporadic form.

These mild cases of *pestis ambulans* are well known to be often of a chronic nature, lasting sometimes for months, and it is not surprising that individuals visiting endemic areas should shew symptoms of this disease in other countries. We had no intention of referring to the Shropshire Regiment, but as the Medical Board have published the fact that cases of non-venereal buboes have occurred among the soldiers of that regiment, we cannot help remembering the fact that they came from Hongkong at the beginning of 1895; that they were very active in attempting to stamp out the plague; that fatal cases occurred amongst them; and that they have suffered from non-venereal buboes ever since; and it is a significant fact that it is only since the Shropshire Regiment came from Hongkong that difficulties in diagnosis regarding these buboes appear to have arisen. It is no answer to say that soldiers belonging to this Regiment who have never been in Hongkong suffer also in a similar way, for this is just what might be expected from an indirectly infectious disease. Nor is it sufficient to shew by statistics that so many cases of buboes have occurred within a certain period or amongst a certain class, for statistics are absolutely valueless in determining the causes of any disease. Probably most of these statistical buboes were venereal or due to peripheral irritation, and if they were not the pertinent question may be asked what were they? The Medical Board make no attempt to answer this question. But it is of too great importance to be left in this state of uncertainty, and we

are of opinion that a searching enquiry and investigation of a scientific character should be undertaken to discover the exact nature of these non-venereal buboes, and their possible relationship to plague.

The attitude of the Medical Board is easily understood, and from many points of view, especially the commercial, appears to be laudable; but when viewed from a wider aspect, it is a shortsighted policy, and not likely to be in the best interests, either of the public or even of the mercantile community. We have an example in Bombay of a similar policy as that pursued by the Medical Board and its results. Bombay concealed its first cases, then minimised them, and now it is face to face with a severe epidemic, its trade is ruined, and by its flying population it is likely to spread the disease far and wide.

Medical News.

SIR JOSEPH LISTER RAISED TO THE PEERAGE.

It is a source of much gratification to the medical profession that Her Majesty the Queen has raised Sir Joseph Lister to the Peerage.

HONORARY DEGREES FOR MEDICAL MEN.

At a recent meeting for conferring degrees at the Royal University of Ireland, Honorary Degrees were conferred on Dr. Thomas More Madden and Sir Charles A. Cameron. Dr. Madden is a well-known obstetrician and author of a treatise on Clinical Gynaecology and other standard medical works. Sir Charles Cameron is the Health Officer for Dublin, and as President of the College of Surgeons, Ireland, and of the British Institute of Public Health, and author of several works in Hygiene, is also widely known.

PLAGUE IN BOMBAY.

WE notice with regret that the death-rate for the week ending 29th December is 115·41—the number of deaths being 1,853, including 391 from bubonic fever and 481 from remittent fever. If this account is to be taken as correct, to what disease is the balance of the total deaths to be attributed? For it is to be borne in mind that the ordinary number of deaths in Bombay at this period of the year, when the population has not been diminished by some 200,000 inhabitants who have fled from the city, is less than 400. There is no outbreak of small-pox or other known epidemic prevailing in Bombay, so that if these deaths are not due to plague, then some terrible disease is prevailing in the city which is

worse than the plague, the so-called bubonic fever slaying 390 of the inhabitants a week, while the new visitation causes a thousand deaths in the same period.

It is difficult to understand this policy of refusing to look unpleasant facts in the face, the gain is little and the loss is great. We are sorry to observe that this system has been pursued from the commencement by the Bombay authorities, and they have only themselves to blame if their returns are viewed with suspicion.

PLAGUE AT KARACHI.

As was to have been expected, plague has not limited itself to Bombay and has now gained a foothold at Karachi. Since its introduction into this town 63 cases with 59 deaths have been reported, and that the disease is making rapid advances is evident from the fact that on December 30th no fewer than 31 cases with 28 deaths occurred. The fact that Karachi has become infected from Bombay shews how important it is that all places having intimate communication with Bombay should immediately, if they have not done so before, take precautions to prevent importation and lodgment of the disease by segregating the first cases, mild or otherwise, which may reach them.

Similar measure to those taken in Calcutta as soon as the occurrence of the epidemic in Bombay became known, should be carried out in every threatened locality.

PLAGUE IN LONDON.

We observe in the last issue of the *British Medical Journal* that two, if not three, cases of plague have occurred in London. We fear this is the first result of the ostrich-like policy displayed in Bombay by which the health authorities of the ports in communication with Bombay have been taken unawares, for there appears to be no doubt that these cases which have occurred in London were imported from Bombay, and at a period before it was officially announced that plague existed in the latter city. There does not seem to be the same reluctance to acknowledge the presence of this disease in London, a city not inferior in its commercial interests to either Bombay or Calcutta, and we cannot help thinking if a similar open policy had been pursued in the East, the plague would not have assumed its present dimensions which bodes ill for its ravages in the future.

LONDON LETTER.

THE history of vaccination in India is a record of energy and enthusiasm warring against prejudice and apathy. The early introduction of the virus into India is a romantic story which chronicles how stage by stage it was transmitted by

successive vaccinations overland from Constantinople through Mesopotamia to Bombay, thence to Madras and finally to Calcutta. This was in the dawn of the present century, and now that the century is very near its close, two questions arise and press for a reply, namely, has the practice of vaccination become as general and effective as it ought and might, and have the prevalence and fatality of small-pox been in any material degree diminished by it? It is difficult to supply anything like a complete or satisfactory answer to these questions in the absence of reliable statistics; but, as regards the first, it is certain that while a great deal has been done, much still remains to be done to render vaccination exhaustive and really protective.

In every vaccination report one is struck by the small number of children under one year of age that are vaccinated, and it is precisely this class which in highest proportion sickens and dies of small-pox. Vaccination has in every part of India passed through three stages—the desultory, the nomadic and the systematic. It has been warmly encouraged and supported by the authorities and rendered compulsory by law in many places, while the pernicious practice of variolous inoculation has been discouraged and prohibited by law. It is satisfactory to note that settled and systematic vaccination by operators of fixed abode and definite area working under careful supervision is now the rule in most places, and it wants but time and steady persistence to perfect the system. The supply of lymph has from first to last been a matter of trouble and anxiety. Stored lymph, whether on glasses or points or in tubes and crusts, has never been found satisfactory. Arm-to-arm vaccination was at one time held to be the only really reliable method, but objections—some frivolous, some sentimental, some religious, and some more or less valid—were everywhere urged against it, and it was felt that the practice was a cause of short work and much obstruction. It was, therefore, sought by means of animal vaccination to disarm opposition and accelerate work. But this method was in its turn found to have its difficulties and hostilities, and now it would seem that a combination of the virus with glycerine, lanoline or vaseline, offers a solution of the great problem of lymph conveyance and transference. The experience gained in the Punjab in 1895 would seem to indicate that vaseline constitutes under proper precautions the best medium of preserving and distributing lymph. All these are matters of exceeding interest and importance, and a more or less detailed history of the progress of vaccination in India during the 19th century would be a very entertaining and useful work. As regards the second question as to the influence which vaccination has exercised on the morbidity and mortality caused by small-pox, it is perhaps

impossible to compare recent with remote times. Yet it is becoming more certain yearly that the best vaccinated places and communities are those which suffer least from small-pox, and that the disease is milder and less fatal among the vaccinated than the unvaccinated.

On Saturday, the 14th of November, the new law which was passed last year relative to "automotor cars," carriages propelled by mechanical agencies, came into force. This law removes the restrictions as to speed, &c., which practically prohibited the use of such conveyance for purposes of locomotion or traction. We are therefore on the eve of a new departure in the very important matter of travelling, and it remains to be seen what effect the substitution of mechanical for animal power will exercise upon the convenience, comfort and safety of road and street traffic. France is in advance of us in this matter, and the experience which has been gained across the Channel regarding the use of machines is highly encouraging. In this country trials have been mostly limited to confined areas as of the Crystal Palace and Imperial Institute, but preparations have been made for starting the new vehicle on a large scale on Saturday. The bicycle has largely taken the place of walking, and it remains to be seen whether steam and electricity will displace the horse. No doubt a plentiful crop of accidents will occur in the early days of road machinery. I remember that when tramways were started in Calcutta, our surgical wards were full of injuries and mutilations; but as people grew used to the cars, and drivers got more cautious such cases became rare. So in railway travelling multitudes of smashes and accidents of sorts occurred in its early days. Now there is no safer mode of travelling in existence. One also hears less of cycle accidents now than a few years ago. So in regard to the automotor cars, time and experience will probably cause their management to become familiar and safe. From the point of view of the horse, the change will be a very beneficial one. The disasters which are continually occurring on the slippery streets of London and other large towns are incessant and painful. The horse will never cease to be an instrument of pleasure to men and women, but, as an agent of business, his services will probably step by step cease to be brought into requisition.

The curious phenomenon of an outbreak of beri-beri in an Irish lunatic asylum, to which I referred in a previous letter, has been repeated in the same institution—the Richmond Asylum, Dublin. To read of an event of this sort in the Rangoon Lunatic Asylum where the disease broke out with severity last year does not excite surprise; but in the United Kingdom an epidemic of beri-beri is indeed a strange occurrence. Thirty-one male lunatics, fifty-nine female lunatics and six nurses have been attacked, and six deaths of insane women have taken place. From the de-

scriptions which have been given of the disease there seems to be no doubt of the accuracy of the diagnosis. The dropsical and neuritic symptoms are well marked. No reasonable explanation or even conjecture has been offered regarding the causation of this singular outbreak. I cannot help thinking that all the resources of modern science ought to be brought to bear on the investigation of the question, particularly as regards the very probable microbic nature of the malady.

"Plague and famine" constitute a very sinister conjuncture, and this is precisely what appears from the telegrams to be impending over India. It is to be hoped that the active repressive measures which are being adopted in Bombay and Calcutta will result in extinction of the former as they appear already to have led to some measure of abatement. Isolation and cleansing are undoubtedly the means to that end. The entries of new students in London and provincial medical schools are some 20 per cent. fewer than usual. It is noteworthy that those of University Schools, where degrees are obtainable, indicate a tendency to increase. If London is to maintain its wonted position in regard to medical education, it seems imperative that arrangements for permitting the students of its large hospital schools to obtain medical degrees on reasonable terms, which have so long hung fire, should be expedited.

13th November 1896.

Transactions of Medical Society.

CALCUTTA MEDICAL SOCIETY.

THE usual monthly meeting was held on Wednesday, the 9th December 1896, in the Medical College Hospital at 6 P.M.; Dr. BOLYE CHANDRA SEN, the President, in the chair.

Dr. KEDERNATH DAS read notes of a case of hepatic abscess, in which the inferior vena cava burst into the abscess cavity, after the latter was aspirated.

CHINIBASH HAZRA, a Hindu male, *æt.* 45, a cultivator by occupation, was admitted in the Second Physician's Ward, Medical College Hospital, on 18th August 1896.

Previous History.—Fever and pain in the hepatic region for 22 days. Pain all over the abdomen since yesterday. No history of alcoholism and dysentery.

Present condition.—Patient weak and badly nourished. There was some bulging of the right side of the chest; intercostal spaces slightly widened out. Hepatic dullness from the 5th rib in the mammary, 6th in the midaxillary, and 8th rib in the posterior axillary line to 3 inches below the costal arch in the mammary line. Other organs normal. Temp. 100° F. Poultice over the abdomen, hypodermic injection of morphia and other mixture ordered. E. T. 99° F. On 19th August 1896 M. T. 101° 6 F. Pain much. E. T. 101° 6 F. On 20th August 1896 M. T. 100° 4 F. Pulse small, soft and frequent. Patient low. He was transferred to the Second Surgeon's Ward where an aspirator trocar was introduced in the 6th space and pus evacuated. Patient immediately collapsed and died.

Post-mortem examination half an hour after death. Body badly nourished. A punctured wound found in the 6th inter-costal space on the right side in the mammary line. On opening the abdomen the liver was found to extend considerably below the costal arch. A punctured wound was found on its upper surface.

about 2" external to the suspensory ligament. About 40 ounces of blood was found in the peritoneal cavity. No apparent oozing from the punctured wound. The upper surface of the right lobe of the liver was adherent to the diaphragm by recent adhesions and the under surface of the right lung was also adherent to the diaphragm at the corresponding part.

There was a large abscess cavity found on the upper and posterior part of the right lobe of the liver, containing about ten ounces of thick pus, partly bile-stained and partly with clots of blood. The walls of the cavity are ragged, sloughing and irregular. On following along the punctured wound, no large vessel was found punctured by the trocar. The external wall of the cavity is in contact with the inferior vena cava. The wall of the vein there was dark in colour from inflammation and is covered with a small quantity of thrombus. The abscess in one place is perforated into the vein, by a small branch of it, about $\frac{1}{4}$ inch in diameter. Through the left of the vena cava, the abscess was found ruptured into the peritoneum, and through this, the blood from the vena cava entering the abscess cavity escaped into the peritoneal cavity.

The specimen of liver was then shown to the members of the Society.

Assistant Surgeon BENGDEBHARY GHOSAL, L.M.S., read a short paper on the use of dilute hydrofluoric acid in cystic goitre with notes of a case successfully treated by that drug. He said, Gentlemen, before reading to you the notes of the case, it is desirable to lay before you the reasons which induced me to use this drug. I was aware that fluoro-quinine was very efficacious in cases of hypertrophy of spleen and thought that a fluoro- or fluoric acid might also be efficacious in diminishing the size of a bronchocele. Of course, I used it from simple analogy. On referring to the standard works on therapeutics I found that most of them do not say anything about the drug. Pepper and Martindale only say that fluoric acid has been used successfully in goitre. On searching further into the literature of the subject, to find if possible the rationale of the use of fluoric acid in goitre, I came across an excellent paper "On the Pathogeny and Treatment of Goitre" by Dr. Edward Woakes published in the *Lancet* of 1881. The author treated twenty cases with fluoric acid; of these seventeen recovered and three failed to receive benefit from the drug. I shall very briefly put before you the reasons which induced Dr. Woakes to use this drug. "The first had reference to the pathogeny of bronchocele. The morbid process, according to him, consisted in a paresis of the vasomotor nerves which mediate the vessel area constituted by the thyroid gland. The outcome of such paresis was a chronic state of vessel dilatation. The thyroid gland seemed to act as a diverticulum or reservoir for storing away a certain amount of blood, which if not thus disposed of, would prove embarrassing to organs of more vital import." Dr. Woakes then discussed the causes which brought about this paresis. "The second principle which guided him to select fluoric acid for the treatment of bronchocele was to some extent the outcome of the preceding views on the genesis of the disease. There is a physiological relationship between drugs belonging to natural groups, whether in the domain of botany or chemistry and the vaso-motor areas. Finding that experience had already though empirically, proved that some members of the group of metalloids including iodine and bromine exerted a curative influence upon goitrous disease, the inference that other members of the same group might act similarly or even more potently, was strictly within the lines of the therapeutic principle just indicated. The fluoric compounds were untried; an appeal to them seemed legitimate."

Dr. Woakes explains the *modus operandi* of fluoric acid in the following way: "The vessel area of the thyroid gland has become a part of least resistance, as regards the vascular system at large. This implies a fault not so much in the blood vessels themselves as in the sympathetic ganglia which furnish the nervi vasorum of these thyroid vessels. The fluoric restores the lost contractile function to the impoverished ganglia."

The following are the short notes of the case in which I used fluoric acid with success: "In September 1893, I was called in to see a respectable Hindu widow, *et. 45*, of Calcutta, suffering from a tumour on the anterior aspect of the neck, of two years' duration. There was dysphagia with slight dyspnoea. On examination I found a tumour on the left side of her throat, of the size of an orange. The skin over it, tense, shining and freely movable and blue veins crossing over it. The larynx and trachea were pushed to right and the oesophagus pressed upon. The tumour was tense and there was a feeling of fluctuation. General condition fair. She was dyspeptic."

"I advised an operation for its removal to which the relatives objected. I accordingly put her on iodide of potassium and arsenic internally and mix. hyd. iodid. locally. This treatment was continued for a fortnight without any effect. I then had recourse to acid hydrofluoric dil. m. x. with liq. arsenicalis hyd. m. iii. three times a day after meals. After a week the tumour seemed less tense and smaller. I gradually increased the dose of hydrofluoric acid to half a dram thrice daily. At the end of two months the tumour was found to have diminished to the size of a small area nut. The tumour entirely disappeared after a fortnight more."

My object in bringing forward this subject is simply to draw the attention of the members of the profession, specially those working in goitrous districts, so that they might give this drug a fair trial and report the results obtained by its use.

Dr. B. C. SEN then read notes of a case of ascites in which the fluid evacuated by paracentesis abdominis was sanguinous.

Current Medical Literature.

MEDICINE.

POISONOUS HONEY. (By L. F. KEBLER, Ph.C., B.S. *The Medical and Surgical Reporter*).—Mr. Kebler alludes to the classical instances recorded of poisoning by honey, *e.g.*, Xenophon, Strabo, Pliny, Dioscorides, Diodorus Siculus and Aristotle all mention startling cases which occurred chiefly in Asia Minor. But several well authenticated cases of honey poisoning have been noted in the United States of America. B. S. Barton read a paper on poisonous honey from W. Pennsylvania as far back as 1794. Only last year eight cases were reported in New Jersey. In the same State fourteen people suffered from honey poisoning in 1852. During the War of the Rebellion, some soldiers were similarly afflicted in the Southern States. At Branchville, S. Carolina, twenty persons were poisoned by honey, three of whom died. In this instance, the honey was declared to be impregnated with gelsemine.

Various conjectures have been made as to the cause of the pernicious transformation in honey. Some believe that the change occurs after the honey has been stored; but the majority attribute the honey poison to the bees having access to flowers containing poison. Two varieties of aconite, *kalmia latifolia*, *azalea pontica*, and some rhododendrons have been supposed to be the source of the poison; but most of the evidence is conjectural. It is, however, certain that the honey produced by bees which have access to certain species of *Ericaceæ* acts as a narcotico-irritant. It has also been ascertained that many *Ericaceæ* contain the active poison andromedotoxin.

There is nothing very characteristic by which to distinguish some specimens of poisonous honey. Whereas others at once excite suspicion by their dark, reddish-brown colour, nauseating odour, and pungent, burning taste.

The symptoms are briefly described as retching, vomiting, purging, acute gastric and abdominal pain, and continued cramps for some hours, with surface coldness and deadly pallor, and the general signs of collapse. In less severe cases the phenomena resemble the various stages of intoxication.

PILOCARPINE IN THE URÆMIA OF BRIGHT'S DISEASE. (By C. J. PROBEN, M.D. *The New York Medical Journal*).—Dr. Proben cites three cases of uræmia in chronic Bright's disease in which the hypodermic injection of $\frac{1}{2}$ th to $\frac{3}{4}$ rd of a grain of pilocarpine hydrochloride was rapidly followed by collapse, cardiac failure,

pulmonary oedema, and death. His experience leads him to state that "pilocarpine is a marked cardiac depressant and a dangerous remedy to administer in uræmia, that its sphere of usefulness is but a limited one, that it should be banished from our therapeutics of Bright's disease, and that its application should be relegated to another sphere."

TREATMENT OF HÆMOPTYSIS. (By R. H. BABCOCK, M.D. *Medicine*, September 1896).—After stating the results of a collective investigation into the methods employed by the chief physicians in Chicago, Dr. Babcock thus describes the treatment employed by himself:—If there be profuse hæmorrhage from a lung cavity, he gives a hypodermic injection of sulphate of atropine, one-fiftieth to one twenty-fifth of a grain. He believes that this arrests profuse pulmonary hæmorrhage better than any other drug. The initial increase in the heart's rate and vigour is succeeded by lowered blood pressure, owing to peripheral vasomotor paresis. Subsequent treatment is directed to maintain the effect of the atropine. Along with absolute physical and mental rest, and unstimulating diet, he prescribes ipecacuanha, codeine and laxatives.

In the hæmoptysis of active hyperæmia he endeavours to soothe the cough with phosphate of codeine, one-quarter to one-half of a grain hypodermically, or one-half grain by the mouth. He also gives frequent doses of syrup of ipecacuanha until nausea is induced, and such aperients as Hunyadi or Rubinat water.

In the same journal favourable reference is made to the recent use of *Geranium maculatum* in hæmoptysis. The tincture, in doses of two to five minims, is prescribed every two hours. The *Geranium maculatum* is said to contain about 30 per cent. of gallic and tannic acids, together with gum resins, sugar, starch and albumen.

THYROID THERAPY. (By J. B. HERRICK, M.D. *Medicine*, August 1896).—Dr. Herrick has a very high opinion of the efficacy of thyroid extract, and his conclusions are:—

"1. It is curative in myxœdema (idiopathic, cretinism, operative).

2. Many cases of obesity are cured by it.

3. Simple hyperplastic struma, particularly if in the young, is frequently cured or improved.

4. In 1, 2, and 3, the remedy has to be continued for an indefinite time, to prevent relapse.

5. It may prove of value in some cases of tetany.

6. In skin diseases it is of doubtful value, to say the least.

7. The same is true of mental and nervous diseases.

8. In exophthalmic goitre it is contra-indicated.

9. The results are practically the same whether fresh glands, extracts, or dried glands are employed.

10. This is probably true also of the thyro-iodine of Banmann."

CHLOROFORM NARCOSIS. (By F. McEWEN, M.D. *The Medical and Surgical Reporter*).—"It has been demonstrated by Snow that when 12 minims of chloroform circulate in the blood they produce primary anæsthesia; 18 minims similarly effect surgical narcosis; and 36 minims cause paralysis of the medullary centres and death.

"Again, 1 minim of chloroform is equal to 1 cubic inch of chloroform vapour, and it requires 7 cubic inches of air to take up 1 cubic inch of chloroform vapour; hence 36 minims of chloroform, or a fatal dose, produce 37.5 cubic inches of chloroform vapour, which requires 262 cubic inches of air to hold it.

"Now, allowing 20 cubic inches as the amount of tidal air, it would require 15 respiratory acts to take in the 262 cubic inches of vapour thus formed. If a vapour of this strength was constantly inhaled, it would be simply a question of time when its residual and reserve air would become saturated; and as 200 cubic inches represent the amount of air constantly present in the lungs, this amount would contain the vapour of 30 minims of chloroform. Allowing that only half of this quantity is absorbed, we would have 18 minims (the amount already circulating in the blood) plus 15 minims, i.e., half the quantity present in the lungs, or altogether 33 minims of chloroform vapour, quite enough to produce paralysis of the medullary centres."

As a result of his personal observations, Dr. McEwen reports that:—

"The shortest time taken to induce surgical anæsthesia by chloroform was 7 minutes; the longest time 21 minutes; the average time 12 minutes. The smallest amount required to induce surgical anæsthesia was a drachm; the largest quantity 3 drachms 40 minims; and the average, 2 drachms 4 minims. The largest time a patient was kept under chloroform was an hour and a half, and the largest quantity used at any one time was 9 drachms. The ages of the patients varied from 5 weeks to 74 years."

COMPARATIVE TEMPERATURE ON EACH SIDE OF THE BODY IN CEREBRAL LESIONS. (By J. T. ESKRIDGE, M.D. *The American Journal of the Medical Sciences*).—Dr. Eskridge has made an elaborate series of observations on this subject, and he has arrived at the following provisional conclusions:—

"In paralysis from brain lesions the temperature on the paralysed side is equal to, or greater than, that on the unaffected side, when the lesion in the brain is an irritative one; but less on the paralysed side, when the brain lesion is a destructive, non-irritative one. In cases of hemiplegia from cerebral hæmorrhage, the temperature on the paralysed side is lower than on the opposite side during the stage of depression immediately following the hæmorrhage; but

as soon as the reaction has become well established, the temperature rises on the paralysed side to a point about half a degree to a degree Fahrenheit higher than it does on the unaffected side, and remains so for a few weeks, or until, from atrophic changes, the paralysed parts become cooler than the normal side. In a case of hemiplegia of thrombotic origin the difference in temperature of the two sides of the body, at first, is less than occurs from hæmorrhage, but if encephalitis results from the arterial occlusion, the temperature on the paralysed side will equal or exceed that of the normal side for weeks, months or even years, and probably as long as the irritation in the brain remains. In hemiplegia from tumour or abscess of the brain, the temperature may be elevated on the paralysed side from 0.5° to 2° or 3° F. beyond that of the other, the amount of the heightened temperature on the affected side depending upon the degree of irritation in the brain. Theoretically we should expect to find the difference in the temperature of the two sides of the body greater when the paralysis is due to tumour, than when it results from abscess, but I have as yet been unable to determine this point. Slight differences in temperature, always in favour of the same side of the body, extending over a considerable period, are significant; but greater differences may occur for a short time and denote nothing of importance."

D. M. Moir, M.A., M.B.

OBSTETRICS AND GYNÆCOLOGY.

DECIDUOMA MALIGNUM. (*British Medical Journal*).—J. Neumann of Schanta's clinic summarises the present state of our knowledge on this subject. The first symptom is, in the majority of cases, menorrhagia coming on at a most variable period after parturition, this is usually profuse and since it is due to the opening up of vessels by the growth of a tumour, is not, as a rule amenable to ordinary hæmostatic treatment. The patient soon becomes anæmic and cachectic and the tumour increases in size with great or less rapidity. Metastases appear in the vagina, but may be removed in many cases with permanent recovery; if, however, foci are set up in the lungs hæmoptysis occurs with a rapidly fatal issue. Infection takes place through the blood stream. The history of an untreated case is that of an extraordinary malignant uterine tumour leading to metastases, through the blood stream, severe anæmia cachexia and death. If the patient is to be saved the diagnosis must be made early and depends upon the history, the hæmorrhage, the enlargement of the uterus and the detection of a tumour within it; the disease can, however, at this period be absolutely diagnosed only by the detection of the typical deciduoma tissue in a scraping. It must be remembered that any

pregnancy may be the starting point of a malignant deciduoma, the symptoms of which have already been enumerated and the corollary is that every puerperal woman requires medical attention until the flow of blood from the uterus has permanently ceased. Microscopically the author adheres to the views laid down in his book on the subject that both syncytial and ectoderm cells enter into the formation of the tumour. The former spread mainly between the muscle fibres, but the latter take on the characters of a typical epitheliomatous growth, both kinds of cells are intimately bound together and both spread into the blood-vessels. Hence a malignant deciduoma belongs histologically to the carcinomata but pathologically to the sarcomata, exhibiting however sufficient deviation from the normal in its mode of growth to warrant its being placed in a special class. The recent researches of Mettens show that while the syncytium arises from the uterine epithelium Vaughan's layer is derived from the foetal ectoderm and we have therefore the extraordinary circumstance of foetal elements proliferating in the maternal organism which Neumann considers the most interesting discovery, from the scientific point of view which the study of the subject has so far elicited.

OVARIAN DERMIDS: "KÜSTER'S SIGN." (*British Medical Journal*).—Mandestamm notes Küster's teaching that ovarian dermoids rise out of the pelvis when much smaller than other tumours of the ovary, which ultimately rise into the abdomen; they lie on the median line in front of the uterus and if pushed sideways or downwards soon slip back to their usual place. In two cases Mandestamm observed this symptom and explains it by the low density of dermoids which causes them to rise above the heavier pelvic viscera. In a third case diagnosed by Küster's sign, he dropped the dermoid into a basin full of water and observed that it floated. A small ovarian cystoma or adenoma with the usual fluid contents will not float, but the oily liquid and hair in a dermoid are, it appears, not so heavy as the ovarian fluid and the contents of proliferous cysts.

METHYL BLUE IN INOPERABLE CANCER. (*La Medicina Contemporanea*).—Dr. Alessandro of Naples tried parenchymatous injections of the drug every two days and obtained good results. There were diminution and even disappearance of the hæmorrhage; lessening of the pain, diminution in the size and a retardation of the rate of growth of the tumour; the destruction of the tumour and the sclerosis of the granulations.

OVARIAN THERAPY. (*La Presse Médicale*).—M. F. Jayle states that this consists of the administration of (1) the ovary in its natural condition; (2) ovarian powder obtained by desiccation or a glycerine extract. The second

in two grain doses a quarter of an hour before the noon-day meal is preferred. The indications are against (1) the accidents provoked by castration; (2) certain ovarian lesions, (3) the normal menopause; and (4) Basedow's disease; osteomalacia, &c. He concludes that (1) the ovary appears to be the source of an internal secretion which is useful to the economy of the woman; (2) this medication appears to be without danger; (3) it is followed by permanent success in the troubles provoked by the artificial menopause; (4) it appears that it can be used to advantage in the different symptoms due to an ovarian lesion (amenorrhœa, dysmenorrhœa, adiposis, chlorosis); (5) it seems to be useful in certain cases against the symptoms of the natural menopause.

A CONTRIBUTION TO THE STUDY OF OVULATION, MENSTRUATION AND CONCEPTION. (*American Journal Medical Science*).—Strassmann reports the results of a series of experiments to determine the causation of menstruation. Eight experiments were performed on bitches, the abdomen being opened and sterile fluid injected into the ovary, it was found that the increase in the vascular tension of the ovary which followed such injections, produced the phenomena of menstruation including the characteristic changes in the mucous membrane of the uterus. Strassmann finds in the results of his experiments an explanation of the discharge of blood which has been so often observed to follow the removal of one or both ovaries or any operation which interferes with the nervous supply of the genital organs. His experiments and the observations of operators show that menstruation results from an altered condition in the vascular tension of the ovaries produced by a nervous stimulus.

The results of his most interesting studies may be summarised in the following description: the ripening of the ovum produces an increase in the vascular tension of the ovary, causing nervous stimulus to be transmitted to the uterus and bringing about the characteristic enlargement and turgescence of that organ and its lining membrane which are observed at menstruation. This increased vascularity of the womb prepares it to nourish the ovum if impregnated. When conception does not occur the ovum escapes and with it are discharged the surplus blood-supply and epithelial soil which were prepared for it. As has been stated by others, each menstruation is the birth of an unimpregnated ovum.

This teaches us that conception most readily occurs outside the uterus within the tube, pregnancy usually beginning as an extra-uterine or ectopic gestation. Conception most frequently occurs not immediately after menstruation, as has been supposed, but during the two weeks immediately preceding a menstrual period. Menstruation itself is a sign that conception has not occurred. In reckoning the date

of confinement, the last day of the last menstrual period, which has usually been taken, should not be considered as the probable time of conception, but a period preceding by a week or ten days the first menstrual epoch at which menstruation did not occur. Thus, if the last day of the last menstrual period is stated to be the first of a given month, the period of gestation should be counted, not from this day, but from the 20th or possibly the 25th of this month. It is believed that a more accurate estimation of the date of confinement can be obtained by reckoning in accordance with these results.

POSITION OF THE NORMAL OVARY. (*Centralblatt für Gynakologie*).—Waldeyer states that the ovary lies normally in a triangular fossa formed by the round ligament, umbilical artery and ureter. Behind this fossa is a second, bounded by the obturator nerve, artery, and vein as they enter the obturator foramen. The former groove (*fossa ovarii claudii*) may be only slightly defined or so deep that the ovary within it can be neither seen nor felt.

THE PHYSIOLOGY OF MENSTRUATION: A MICROSCOPICAL STUDY: WESTPHALEN. (*American Journal of Obstetrics*).—During menstruation cells of epithelium and the underlying connective tissue undergo in part fatty degeneration, in part they become detached, especially those of the surface and are carried off; the main portion of the mucous membrane however remains intact. The premenstrual condition is restored by an indirect unclear division (mitosis). The period of proliferation is between the sixth and eighteenth days post menses; this is followed by the period of rest, during which proliferation ceases.

KEDARNATH DAS, M.D.

Vital Statistics & Sanitation.

NOTES BY THE DIRECTOR-GENERAL, INDIAN MEDICAL SERVICE, ON THE SICKNESS AND MORTALITY IN THE JAILS UNDER LOCAL GOVERNMENTS AND ADMINISTRATIONS FOR THE YEAR 1895.

MADRAS.

THE daily average strength of all classes of prisoners was 9,790, the daily average sick was 237, and the total deaths, including 11 from cholera, was 178.

2. The average strength of convicts in central and district jails was 8031.37, the daily average sick 231.23, and the total deaths, including 9 from cholera, was 159. The ratio of deaths per mille was 19.79.

3. In central prisons the average daily strength was 5744.32 with 93 deaths, equal to a ratio per mille of 16.20.

4. In district jails, with an average daily strength of convicts of 2,290, there were 66 deaths, a ratio per mille of 28.8.

5. There was an average daily strength of 4270.59 prisoners under six months' residence in jail. There were 80 deaths amongst them, equal to a ratio of 18.73 per mille. The strength of those above six months in residence was 4216.42, and the number of deaths was 85, or a ratio of 20.02 per mille.

6. Three cases of cholera occurred in two central prisons, and ten cases in three district ones, resulting in nine deaths.

7. In the districts generally the year was not so healthy as in 1894, and although the ratio of admissions into hospital among the jail population was slightly higher than in the latter year, yet the mortality was lower than in any previous year since 1886.

In that year there were no deaths from cholera, and, excluding those from that disease in 1895, the ratio of deaths was 17·1, or the lowest on record.

8. The Inspector-General of Prisons ascribes the successful result to the great care given to the proper feeding of the prisoners, and he declares in paragraph 76 of the report that a high rate of sickness and mortality shows that due care has not been taken in the "proper selection, preparation and distribution of the food to the prisoners. That this is in practice the most important factor in determining the health of the prisoners in jails in this country. I am more and more convinced, and it is evident that the care devoted to the food can never be relaxed."

9. The admissions for intermittent fever increased from 1,323 in 1891 to 1,453 in 1895; and of remittent and continued fevers from 252 to 559. In consequence of this increase, and because of the debilitating effects of malarial fevers on the individuals attacked, the Inspector-General of Prisons has decided to introduce the daily issue of prophylactics in the feverish seasons of the year. If quinine and cinchonidine are to be used, it would be desirable to combine them with iron and sulphuric acid, and to give them in appropriate doses.

10. The number of admissions for remittent and continued fevers is high, and it would be satisfactory if, in future reports, some details were given as to the etiology and symptoms of the cases admitted under the former.

11. As cases of phthisis pulmonalis are on the increase in the central prisons at Coimbatore and Vellore, steps have been taken for the segregation of the patients so affected.

12. The jails at Parratipuram and Cuddapah have been temporarily closed on account of their unhealthiness.

13. It may be noted that the cases of beri-beri occurring in the Rajahmundry jail, where the disease appears to be endemic, have been transferred to Vellore Central Prison, with satisfactory results.

BOMBAY.

The average daily strength of convicts confined in central and district jails was 6,932. The number admitted into hospital was 7,199, and the total number of deaths, 222. The daily average sick was 232·2, and the ratio of deaths per mille of average daily strength was 32·0. The daily average sick was slightly greater, and the ratio of deaths rather lower than in 1894.

2. The chief causes of sickness and mortality were dysentery and diarrhoea, 1894 cases with 71 deaths; respiratory diseases 459 cases with 60 deaths; including 154 cases of pneumonia with 51 deaths; remittent, continued and other non-malarial fevers, 134 cases with 13 deaths; phthisis pulmonalis, 45 cases with 18 deaths; and anæmia and general debility 102 cases with 8 deaths. The admissions for intermittent fever amounted to 2,927, and it has been ascertained from the annual return of sick that, among all classes of prisoners there were 499 admissions for abscesses, boils and ulcers, and 74 for scurvy. The admissions for scurvy are equal to a ratio of 10·03 per mille of average daily strength, nearly double of that in the jails of any of the other provinces. There were only 5 deaths from cholera, all occurring among the Deccan gang of prisoners. Excluding fevers, the above figures show a large proportion of cases, which may directly and indirectly be ascribed to dietetic causes.

3. The incidence of mortality among convicts in particular jails was in the following order:—

	Daily average strength	Number of deaths.	Ratio of death per mille of average daily strength.
1. Nasick	39	None	...
2. Rajkot	53	None	...
3. Karwar	71	None	...
4. Sind Gang	353	2	5·7
5. Dhurwar	376	4	10·6
6. Ratnagiri	85	1	11·8
7. Dhulia	247	3	12·1
8. Bijapur	246	3	12·2
9. Aden	43	1	23·2
10. Yerrowda	1,595	41	25·7
11. House of Correction, Bombay (Natives)	292	9	30·8
12. Shikapur	335	12	31·2
13. Hyderabad	684	22	2·2
14. Karachi	273	11	40·3
15. Common Prison, Bombay	257	11	42·8
16. Deccan Gang	294	15	51·0
17. Ahmedabad	929	48	51·7
18. Thana	699	39	55·8

4. Only the first 13 of the above jails, with the exception of Nasick and the House of Correction, Bombay, were, as appears from Appendix E, in charge of medical officers. The eleven jails under their charge had an average daily strength of 4,138 with 89 deaths, or a ratio per mille on strength of 21·50. In the 7 other jails the average daily strength was 2,783 with 153 deaths, or a ratio of 47·78. This may be a mere coincidence, but it seems deserving of notice.

5. In the statement of paragraph 70 of the report, the effects of residence in jails on the death-rate of the prisoners are shown. The average daily strength of those in residence under six months was 3,319, and among them 72 deaths occurred, equal to a ratio per mille of 21·5. The average daily strength of those above six months was 3,532, and the number of deaths was 150, or a ratio of 41·88.

6. As the mortality in subordinate jails and lock-ups, in which it is presumed only prisoners sentenced to short terms and under trial are confined, was only 5·8 and 19·0 on an average daily strength of 517 and 631 respectively (statement at paragraph 65), it may be assumed, taken in connection with the effects of residence, that the prisoners on admission into the jails were generally in a normal state of health.

7. It is difficult, from the meagre details given in the report, to ascertain what the special conditions of jail life were which gave rise to the increased mortality, but they may be inferred from the information given above regarding the diseases causing the admissions, that it was highly probable that the chief cause of the sickness leading to the mortality, was in connection with the food issued to the prisoners.

8. No information is given in the report as to the quality or variety of vegetables issued; only the money value is stated of those supplied from the jail gardens. Anæmic and scorbutic conditions appear to have been prevalent among the prisoners: the latter in a severe form, but no special efforts appear to have been made to meet these conditions. No addition was made to the diet, and there was no increased issue of vegetables or anti-scorbutics.

9. The scales of diet in use may theoretically meet the physiological requirements of these prisoners, but they are on a less liberal scale than those in certain other provinces, and to derive from them their full nutritive value, it is necessary that the ingredients should be of the best quality, and that the cooking arrangements should be thoroughly efficient and carefully supervised.

10. There are two scales in use for prisoners sentenced to hard labour, one for those on intramural and medium labour, and the other for those on *bond fide* hard labour. The first is as follows:—

Wheat, hajri, nagli or jowari	... 20 oz.
Dal	... 4 oz. six days a week.
Salt	... 8 drs.
Vegetables	... 6 oz.
Curry stuff	... 4 drs.
Tamarind	... 4 drs.
Oil	... 4 drs.
Animal food	... 4 oz. once a week.

11. In the second scale the amount of cereals is increased by 4 oz., the dal by 1 oz., the vegetables by 2 oz., curry stuff by 4 drs., and the animal food by 1 oz. Slight variations are allowed on the above scales in certain prisons. Two scales, for the same class of prisoners have, in Indian jails, been found in practice to be objectionable, for the reasons stated in Chapter XX of the Report of the Committee on Jail Administration in India, appointed in 1893, and the No. 11. scale in use in Bombay jails, might be issued to all labouring prisoners, any modifications for individuals being left to the discretion of the Medical Officer. The issue of 2 chittacks of hoiled rice with salt, as an early morning meal, has been followed by excellent results in Bengal and elsewhere, and might be introduced into the jails of Bombay.

12. As the prisoners appear to be liable to attacks of malarial fever, it would be of advantage to sanction the daily issue of cinchonidine or quinine in six grain-doses, combined with iron and sulphuric acid, during the unhealthy months.

13. Seventy-one cases of pneumonia, or nearly one-half of the total number, occurred in the Sind jails. In the Ahmedabad jail there were 29 cases, and 20 in the one at Yerrowda. The average cost per head of bedding and clothing in all jails was Rs. 3·2, in Yerrowda it was Rs. 2·4, in Ahmedabad Rs. 2·14, in Karachi Rs. 2·12, in Hyderabad Rs. 6·1 and in Shikarpur Rs. 5·1. It seems desirable that special measures should be taken for providing a sufficiency of suitable bedding and clothing for the prisoners confined in these jails.

14. Although no reference is made to the Sind gang in the remarks under the heading "Vital" in the report, yet some useful lessons may be learned, by a reference to the figures relating to it, contained in the different statements. The total population, during the year was 854, and the average daily strength was 353. The number of admissions into Hospital was 156, the average daily sick was 3·1, and there were only two deaths. There were 13 cases of pneumonia with no deaths. Twenty-nine invalids were transferred to the Hyderabad prison. The gang, no doubt, composed of selected men, "was employed on the hardest form of labour in the way of digging and embankment work" (paragraph 35 of the report), they were lightly housed and were exposed to all the variations of temperature and weather, yet they were particularly healthy, owing, no doubt, to the extra liberal diet which they received, and to the sufficiency of bedding and clothing supplied to them.

15. The diet necessary for prisoners working under exceptional circumstances, has, in this instance, been determined by actual experience: could not a similar experience be applied to those prisoners living under the ordinary conditions of jail life?

BENGAL.

The average daily strength of all classes of prisoners was 16,925'11, consisting of convicts 15,629'59, under-trial prisoners 1,345'16 and civil prisoners 50'36. The mortality was the lowest on record. The total number of deaths among all classes in confinement was 465, as compared with 817 in the previous year. The ratio per mille of deaths on average strength was, among convicts 26'9, among under-trial prisoners 33'4, and among civil prisoners 39'7, or a ratio in all classes of 27'4. In 1894, the ratio was 47'1 per mille, and the average for the previous 5 years was 37'2. The mortality in 1895 was lower by 3'5 than in any previous year, and this must be considered as a notable occurrence in the history of the Bengal jails. The year was reported to have been a healthy one in the province generally, but in other years, the free population have been equally healthy, so that this alone is not sufficient to account for the diminished mortality. It must, I think, be in great part fairly ascribed to the careful supervision exercised by the Inspector-General of Prisons over all the details of jail management, and to the intelligent and effective manner in which local conditions, affecting the health of the prisoners, have been met and overcome.

2. In the Central prisons, where the incidence of jail life on the health of the prisoners can be more strictly gauged than in district ones, the mortality was much lower than the Provincial ratio. In Midnapur (Central and District Jail) the mortality among convicts was 21'5 per mille

In Alipur	...	13'7
In Presidency	...	21'0
In Rampur Boalia	...	20'0
In Dacca	...	23'1
In Buxar	...	15'2
In Bhagalpur	...	9'2
In Hazaribagh	...	21'8

3. In the 27 jails noted at paragraph 120 of the report, including both District and Central, with an average daily population of 12,411'96, the total number of deaths was only 221, or a ratio per mille of 17'80.

4. The ratio of deaths among prisoners, who were in confinement for six months and under, was 31'3 per mille as compared with 51'9 in 1894.

5. The admissions for dysentery and diarrhoea fell from 6,107 in 1894 to 5,666, and these diseases were of a milder type than in former years. The total do this in 1894 were 314, and in 1895, 155; or a ratio per mille to average strength of 19'5 and 9'9, respectively.

6. The ratio of admissions for intermittent fever was slightly in excess of that in the previous year, being 351'5 with 9 deaths as compared with 344'0 and 4 deaths in 1894. Prophylactics, in the form of quinine or cinchonidine were issued, but no effects, directly traceable to their use, are in evidence. Their value has, however, been recognized by some of the medical officers, and their issue in larger doses will be continued during the unhealthy season of the present year.

7. Given in prophylactic doses, these drugs may not entirely avert attacks of intermittent fever, but they will modify the intensity of the attack, and must exert a beneficial influence in protecting the system against the sequelae of these fevers.

8. Remittent and continued fevers accounted for 1,110 admissions with 17 deaths. Judging from the perusal of the *post-mortem* reports of these cases, which are received in this office, it would appear that the terms remittent and continued fever include cases of specific organic disease, which are usually associated with fever of a remittent type. When the *post-mortem* examination has disclosed the real nature of the disease, the case should be returned under its proper heading, and not under that of one of its symptoms.

9. There were only 26 deaths from cholera and 1 from small-pox.

10. The diet scales of Statement VIII (Judicial) are liberal and varied, and every effort appears to have been made to modify them to suit the requirements of particular circumstances. Great attention is being given to the preparation of the food, and every care is taken to ensure its being thoroughly cooked. Improved cooking ranges are being introduced and fitted into those jails, where new ranges are required.

12. The jail gardens are very productive, and the cultivation of nutritious vegetables and anti-scorbutics is encouraged in every way. The estimated value of the products supplied from the gardens amounted to Rs. 43,299, while only Rs. 8,176 were expended, almost entirely at Central Prisons, in the purchase of vegetables, chiefly potatoes and condiments. Milk to the value of Rs. 35,365 was supplied to the prisoners from jail dairies.

13. These, and the measures taken in connection with the supply of drinking water, must be credited with the good results obtained, and for the absence of all symptoms of scurvy in the

Central Prisons, and their general absence in the others: I had an opportunity of examining the prisoners in two of the larger jails at Dacca and Patna, widely separated from each other and situated under entirely different conditions, and was greatly struck by the healthy appearance of the inmates and the almost entire absence of those appearances in the gums and tongue, which are indicative of anaemia and a tendency to scurvy.

14. The unhealthiness of the jails at Balasore, Chaibassa, Motihari, Dumka and Burdwan has been the subject of investigation by special medical committees, and it may be hoped that the recommendations made for improving the local conditions, which have met with the approval of Government, will be successful in reducing the sickness and mortality in them.

NORTH-WESTERN PROVINCES AND OUDH.

The daily average strength of the convicts was 30,575, an increase of 4,536 on that of 1894.

2. The sickness was greater and the mortality less than in the previous year. The ratio of daily average sick to average strength in 1894 was 43'74 per mille, and the ratio of deaths 32'45. In 1895 the ratios were 58'64 and 27'34, respectively. In 1893 the deaths were equal to a ratio of 17'34, which was the lowest on record.

3. In paragraph 65 of the report, the Inspector-General of Prisons states that the year 1895 was an exceedingly unhealthy one owing to a succession of bad harvests and that "the people were consequently emaciated and reduced to a state of starvation and suffered a great deal from malaria." A great many of the admissions into the jails were necessarily in a weak state of health and it is not surprising, he says, "that the sickness and mortality, were high." The mortality was, however, only high when contrasted with the figures for 1893, as it compares not unfavourably with that for the preceding six years. In the year 1895, the mortality among the free population was 29'13 per mille, while in 1894 it was 42'51, in 1893, 24'1, and the average of the previous five years was 30'98. Judging, therefore, from these figures, the population generally appears to have been in an average state of health. In some of the districts, however, the medical officers report that a large number of the admissions into jail were in an extremely bad state of health.

4. The death-rates, in Statement XVII (Vital), according to length of residence show that the greatest mortality occurred among the short-term prisoners. These under six months in jail, with a strength of 12,475, had a mortality equal to a ratio of 35'26 per mille, while those above six months with a strength of 18,288, gave a ratio of 21'65 per mille. The mortality among under-trial prisoners was high, being equal to a ratio of 30'19 on an average daily strength of 1,953'80. Again, the mortality in Central Prisons was only equal to a ratio of 17'39, as compared with a ratio of 34'75 in district jails,—all tending to prove that the opinion expressed by the Inspector-General of Prisons, as to the cause of the sickness and mortality is correct, notwithstanding the comparatively low provincial death-rate.

5. The mortality in the district jails would, no doubt, have been much higher if efforts had not been made to control it. Medical officers appear to have exercised the powers entrusted to them, by modifying the ordinary jail diets as was necessary, and by the issue of extra articles of diet to weakly prisoners. The average amount spent per head in all jails on hospital and other extra diets was Re. 1-15-6, but in eleven jails, with a ratio of deaths above 50 per mille, the amount expended on these diets was Rs. 4-14 per head.

6. The causes of the admissions into hospitals were much the same as in previous years. The ratio of admissions for fever and anaemia and debility were higher than in 1894, these for respiratory diseases were lower, and for the other principal diseases nearly similar.

7. The admissions for fevers numbered 8,831 and were classified as intermittent 7,354, remittent and continual 357, and other fevers 1,120. It appears from a reference to the annual sick returns of the jails that in some instances, cases of ague, malarial cachexia, &c., have been returned under the heading "Other fevers," instead of "Intermittent fever." In the annual return of the jail at Moradabad, 117 cases of relapsing fever with 26 deaths are entered as having occurred among convicts. The medical officer reports that the jail was overcrowded and the prisoners underfed, and as these conditions are usually associated with the appearance of this form of fever, his opinion, both as to the nature of the fever and its causes, may for the present be accepted.

8. The ratio of admissions for dysentery and diarrhoea was slightly lower than in 1894, but the death-rate was higher, being 10'72 per mille, as compared with 9'37 in 1894. The total number of deaths from these diseases amounted to 328, or 39'2 per cent. of the total mortality.

9. The admissions for anaemia and debility were 71'0 per mille on average strength, or 21'2 higher than in 1894. The ratio of deaths was small, only 2'01 per mille.

10. The diet scales given in Statement VIII (Judicial) appear to be defective in regard to the quantity of salt, 100 grains, and of oil, $\frac{1}{4}$ chittack, allowed. Half an ounce of each is generally considered to be necessary, and it is the amount recommended by the Committee on Jail Administration appointed in 1889.

11. Although no mention is made, either in the report or in the above statement, of the issue of an early morning meal, yet it is understood that in most of the jails one *chuppattie* is issued to each prisoner at the early morning parade. Such dry food, at such an early hour, can hardly be considered as either palatable or digestible, and the process of deglutition might be assisted by the issue of a small quantity of dahi, (skimmed milk) or whey. Two chittacks of rice with melasses or salt would be a good substitute, and a corresponding reduction could be made in the quantity of cereals and pulses given at the other meals.

12. When pulses are combined with the cereals, one chittack of dal may physiologically be sufficient, but a meal of *chuppatties* with that quantity of dal must be very dry eating, and when the combination of cereals alone is issued, the amount of dal might, it is thought, be increased.

PUNJAB.

The sickness was much less than in 1894, the ratio of admissions into hospital per mille of average strength being 1,451, as compared with the ratio of 1,758 in the previous year.

2. The total deaths, however, increased from 211 to 248, or from a ratio per mille of 18.73 to 21.80. The ratio among convicts was in 1894, 18.89; and in 1895, 22.05.

3. The increase in the death-rate was entirely due to an epidemic of influenza, which appeared in many of the jails during the month of December. In that month alone, there were 69 deaths, chiefly from respiratory diseases. During the previous eleven months, the ratio per mille of deaths in all the jails was only 15.74.

4. In the four central prisons, the total mortality was equal to a ratio of 25.85, while in district jails it was only 19.49. The higher ratio in the former was due to the effects of influenza, on the old and feeble prisoners, transferred from other jails, to the one at Montgomery. In that jail there were 61 deaths, more than half the number occurring in the month of December, the ratio per mille being 51.35. In the other central prisons, the ratio was in Chenawan 11.40, in Lahore 16.39 and in Mooltan 20.44.

5. The deaths from respiratory diseases in all jails amounted to 105, or 42.34 per cent. of the total mortality. Included in the above were 93 deaths from pneumonia, a disease which has almost invariably been the chief cause of the mortality in the jails of the Punjab, and it seems desirable that extra warm clothing should be issued during the cold season to the prisoners in those jails where this disease is most prevalent, and that hospital accommodation, with proper appliances for keeping the air at an equable temperature, should be provided for patients admitted with respiratory diseases.

6. With 1,956 admissions for dysentery and diarrhoea, there were 26 deaths, the lowest on record, and it is satisfactory to note that in 21 of the 33 jails in the Province there were no deaths from these diseases.

7. The admissions under intermittent fever show a remarkable decrease, the number in 1895 being 6,907 as compared with 9,844 in 1894. This fall, in the number is ascribed by the Inspector-General of Prisons, in paragraph 78 of the report, "to the comparative healthiness of the autumnal months, and probably, in some measure, to the administration during the unhealthy season of large quantities of which were supplied to the prisoners." A quotation from the sanitary report of the Superintendent of the Lahore Central Prison states that "the admission rate from malarial fevers rose when the prophylactic was discontinued, and fell on its being re-issued," and he has no hesitation in saying that the use of the prophylactic was the chief factor in maintaining the health of the prisoners during the latter months of the year. It may also have had an indirect influence in modifying the symptoms, in the cases of dysentery and diarrhoea, referred to above.

8. A reference to previous reports shows that these prophylactics were issued to some jails in 1892, and have since then been more extensively employed. The admissions for intermittent fever for the past four years were as follows:—

	Admissions.	Ratio per mille.
1892	18,482	1,535
1893	9,815	835
1894	9,844	925
1895	6,907	648

It must not, however, be concluded from these figures that the decrease was entirely due to prophylactics, because, during the past thirty years, the ratio of admissions was on ten occasions lower than it was in 1895.

9. Comparative experiments were made in the Mooltan Central Prison and in the district ones at Delhi and Lahore, with regard to the effect on the health of the prisoners using boiled and unboiled drinking water, but the results, as given at page V of Appendix A, are not of a very decisive character. In the jails at Umballa, Ludhiana, Amritsar and Karnal, where the water has been systematically boiled for the past two or three years, the ratio of admissions into hospital for all diseases among convicts was 1,386, 1,368, 1,144 and 1,362, respectively, while the ratio

all other district jails was 1344.6. As regards intermittent fever, the ratio was in Umballa 418, in Ludhiana 197, in Amritsar 1,081, in Karnal 724, and the average in all other district jails was 595.

CENTRAL PROVINCES.

The most striking feature in this report, with regard to the vital statistics, is the greatly increased mortality. The total deaths were almost double that in 1894, and the increase was chiefly, if not entirely, due to the greater prevalence and severity of dysentery and diarrhoea.

2. The daily average strength of the convicts was 4648.79, and of under-trial prisoners 289.20. The total number of deaths amounted to 277, nine of which occurred among under-trial prisoners, the ratio per mille of average daily strength in the two classes being 57.65 and 31.12, respectively.

3. The ratio of deaths among convicts in the three central prisons, with an average daily strength of 3119.31 was 31.74, and among the under-trial prisoners who were confined in these jails, with an average daily strength of 76.13, it was 13.14.

4. In district jails, with an average daily strength of 1,529.48 convicts, the ratio was 110.50; and in under-trial prisoners, with an average daily strength of 213.07, the ratio was 37.54, or in both classes of jails combined 31.12. It has been ascertained from the figures in Statement XVIII, that the under-trial prisoners were on an average four days in confinement.

5. In six of these jails, the ratio varied from 102.5 to 378.5 per mille of average daily strength.

6. The lowest mortality was in Nagpur Central Prison 19.4, in Raipur Central Prison 23.1, and in the following district jails, Raipur 25.4, Betul 35.4, Bhandara 36.0, and Wardha 38.1.

7. The Inspector-General of Prisons, in paragraph 86 of the report, thus accounts for the increased mortality:—"The unfavourable conditions of the year previous, continued during the past year, in an aggravated form. The rainfall was in some places deficient and in others unseasonable; the seasons were unhealthy, and prices of food-grains ranged higher than in 1894. The new admissions into jail were generally in poor health and low condition, many of them being admitted at once into the infirm gang or into hospital; and in paragraph 95 he finds from the reports of the medical officers that "there is a general consensus of opinion that the excessive sickness and mortality of the past year were induced, not by the circumstances and conditions existing in jails, but by the consequences resulting from the privations to which the new admissions were exposed outside." The physical condition generally of the prisoners on admission may be gathered from the extracts, given at paragraph 95, from the reports of medical officers,—at Saugor "125 prisoners were brought to the jail in carts or coolies in an advanced state of disease and emaciation, and of the 56 admissions for bowel complaints, 46 had dysentery or diarrhoea when they were admitted into jail."

8. In Narsingpur "the majority of the prisoners admitted into the jail were taken into hospital suffering from broken-down health, anaemia, chronic disease, etc."

9. In Mandla "the new prisoners admitted were often weakly, starved, and in bad health." 201 had spongy gums." It is not quite apparent whether the "spongy gums" refer to the prisoners in jail or to the admissions, as there were only 216 admissions into this jail during the year.

10. In Damoh "all the prisoners with very few exceptions were suffering from spongy gums."

11. The figures in Statement XVII (Vital) are confirmatory of the above reports, in showing that the highest mortality occurred among the recent admissions. The total number of deaths among those under six months residence was 193, which on an average strength of 2,246 equals a ratio of 85.83 per mille, while the deaths among prisoners above six months' residence were 75, or a ratio per mille of 30.9 on an average daily strength of 2,426.

12. It would have been expected that with such a wretched condition of the prisoners on admission, and with such a heavy mortality, there would have been an exceptionally large number of admissions into hospital, but this has not been the case. The daily average sick was 168.90, as compared with 150.63 in 1894, and the ratio per mille to average strength was 36.3, or only one higher than in 1894. This must either mean that the above accounts as to the condition of the prisoners on admission are exaggerated, or that a certain proportion of the prisoners requiring treatment was not admitted into hospital.

13. Dysentery and diarrhoea were, as previously stated, the chief causes of the mortality. There were 936 convicts admitted into hospital for these complaints, with 142 deaths, or 53 per cent. of the total mortality. The figures in 1894, were 518 admissions with 45 deaths. The percentage of deaths to cases was, in 1895, 14.40, and in 1894, 8.68, showing that these diseases were of a much more severe type in the former, than in the latter year. The medical officer of the Jubbulpore jail reports that the dysentery cases were characterized by a gangrenous condition of the transverse and descending colon, without the marked symptoms of true dysentery, and that it appeared to be a chronic form of scrubby dysentery. Several cases having occurred among the hospital servants, he was led to believe that they contracted the

disease from attending on the cases, and the medical officer of the Balaghat jail states, that a warder, transferred from another jail, seems "to have been infected by the hospital patients on whom he was attending." On such and other similar evidence, the Inspector-General of Prisons concludes that "it is thus established that the diseases were infectious."

14. There was evidence of anemia and scurvy and of diseases resulting from these conditions, both outside and inside the jails, and it may in a sense be perfectly true, as stated by the Inspector-General of Prisons, in paragraph 100 of the report, that the causes from which the mortality arose were outside the jails and not in them, but were any particular precautions taken inside the jails to arrest the progress of the sickness which resulted in the mortality? With the great influx of admissions in the low state of health described above, there appears to have been no systematic arrangements made to meet the difficulty. No appreciable changes appear to have been made in the dietary, and the additions, Statement VIII, in the way of antiscorbutics, issued in some jails, were merely palliative.

15. The expenditure in connection with the sick in hospitals and the weak and infirm in convalescent gangs rose from Rs. 4,991 in 1894 to Rs. 8,414 in 1895. Of this amount, Rs. 3,916 were expended under the heading "Sick diets and extras for patients," Rs. 2,493 on "Extras or special diet for weakly prisoners not in hospital," and Rs. 2,005 on "Medicines, hospital bedding and clothing." The total represents an expenditure per head of average daily strength of Rs. 1-11-2.

16. In the Punjab jails, where there was no abnormal sickness, and the ratio of deaths per mille was only 21-80, the expenditure on diet for the sick was Rs. 9,715, on extras for prisoners not in hospital Rs. 8,272, on medicines, &c., Rs. 7,578, and on proportion of daily expenses Rs. 4,790, a total of Rs. 30,355, equal to Rs. 2-10-8 per head of average daily strength.

17. Of the Rs. 2,493 spent in the jails of the Central Provinces on extra diet to prisoners not in hospital, Rs. 1,111, or nearly one-half the total, were expended in the Nagpur Central Prison. The quantity of vegetables supplied to this jail represents a daily issue throughout the year of 6-3 chittacks to each inmate. The ratio on deaths per mille in the jail was 12-4, which low mortality is ascribed by the Inspector-General of Prisons, in paragraph 97, to the completion of a proper system of drainage, and to the lowering the height of the inner walls.

18. I observe that in the report for 1893, the exceptionally low mortality in the Jubbulpore jail during that year is ascribed to improved drainage, but the mortality in 1895 has risen from a ratio of 9-62 per mille in 1893, to one of 44-4 in 1895.

19. In Raipur Central Prison Rs. 480 were spent on extra diets; the mortality was 23-11 per mille.

20. In Bilaspur Rs. 509 were so expended. The average strength was 132, and the deaths eight. Three were due to cholera, and two to dysentery and diarrhoea.

21. Thus of the total amount, Rs. 2,493, expended on extra diets, Rs. 2,100 were disbursed in three jails.

22. The scale of diet in force, if properly cooked, appears to be adequate, but from the experience of the previous years, and of 1895, there is evidently something wrong with the supply of vegetables and antiscorbutics.

23. It is apparent from the remarks in paragraphs 82 to 81 of the report, that sufficient attention is not devoted to the cultivation of suitable vegetables and antiscorbutics in the jail gardens.

24. The difficulty of cultivating, under existing circumstances, nutritious varieties of vegetables at all seasons, in quantities sufficient to meet the full requirements of prisoners liable to a scorbutic taint, is undoubtedly a great one, but it is apparently being overcome in other parts of India; and the Inspector-General of Prisons, Bengal, writes in his report that "the repeated instructions for the growing of the more nutritious and antiscorbutic vegetables, instead of the *sags* and gourds which cumber the ground for a great part of the year, are beginning to have effect, and Otaheite potatoes will be grown and stored in larger quantities. Roman and China cabbages are invaluable vegetables, and the good effects of papaya and tomatoes are recognised."

25. It would, no doubt, be of advantage if quinine or cinchonidine were issued daily in 4 to 6 grain doses, combined with iron and sulphuric acid, as a prophylactic to all convicts in the unhealthy seasons.

26. According to Statement A in the Appendix there appears to have been a certain amount of overcrowding in the barracks occupied by male convicts in some of the jails, and in others the superficial area of the enclosures, in which the prisoners are confined, seems to be exceptionally limited.

BURMA.

The average daily strength of all the prisoners was 13,662, or 1,015 more than in the year 1894. In paragraph 18 (b), page 18, of the report, it is stated that all the jails, except five, were more or less overcrowded during the year, and that it was necessary to occupy verandahs and work-sheds as dormitories. The ratio of deaths on the above strength was 17-93 per mille, and among convicts, on an average daily strength of 13,220, it was 17-17. These figures would not probably have been so favourable,

if fifteen convicts had not been released on account of sickness, but taking them as they are, the death-rate is the lowest ever recorded in these jails: that on the whole body of prisoners being 5-57 below any previous record. It is also the lowest mortality of all jails under Local Governments and Administrations for the year 1895, and it has only been lower in the larger provinces on three occasions, viz., in Madras in 1885 and 1886, when the ratios were 17-86 and 17-53, respectively; and in the North-Western Provinces in 1893, when the ratio was 17-23.

2. It does not appear from the report that any special measures were taken to obtain such a satisfactory result; there was no extraordinary expenditure, and it must be concluded that the low rate of mortality was in consequence of an intelligent and strict attention to all the ordinary details of jail management.

3. The diet is not exceptionally liberal; Burmese labouring prisoners are allowed 24 ounces of rice, but the amount of vegetables, ten ounces daily, sanctioned to each prisoner, is much larger than in any other province, and half an ounce of ngapi, decomposed fish, is issued daily, in addition to the ordinary condiments.

4. The people of Burma are on the whole more healthy and better nourished than those in some of the provinces of India, and that will to some extent account for the greater healthiness of the prisoners.

5. Although the sickness in the seven central prisons was much greater than in district jails, yet the mortality was much lower, being equal to a ratio of 15-48 as compared with one of 21-94 in the latter. On the other hand, short-term prisoners, and those under six months' residence, usually confined in district jails, had a mortality of only 15-66 per mille, while those above six months had a ratio of 18-2.

6. A high rate of mortality is returned against the jails at Sandoway 200-0 per mille, Akyab 79-23, Bhamo 70-42, Pagan 47-06 and Minbu 33-9, but the number of prisoners in these jails, except Akyab, is small, and a few deaths give a high rate. In Sandoway the average daily strength was 35 and in Minbu 118; there were seven deaths in the former and four in the latter, all due to cholera. There seems to have been unnecessary delay in removing the prisoners from the Sandoway jail after the appearance of the first cases of the disease. In Bhamo and Pagan there were five and four deaths respectively. In Akyab there were twenty-nine deaths, thirteen of which were due to dysentery and diarrhoea, six to respiratory diseases and three to phthisis pulmonalis. Bowel-complaints were the chief causes of admissions and deaths in this jail, as they were also in the previous year. The medical officer ascribes these diseases, at page 22 of the report, to various preventible causes, but he does not appear to have turned his knowledge to any good account. The Officiating Inspector-General of Prisons, however, believes that "it is only by the early discovery of failing health and by dietetic and medicinal treatment that this mortality can be combated." If these directions are followed, the result will no doubt be different.

7. In Home Department letter No. 308, dated 3rd August 1895, addressed to the Chief Commissioner of Burma, attention was directed to the great number of cases returned as remittent and continued fever in the jails at Rangoon and Bassein, and it was suggested that there might be an error in the diagnosis. In 1895 there were in the Rangoon Jail 431 cases of remittent and continued fever and 1,011 of intermittent treated. In Bassein the admissions were intermittent 129, remittent and continued 206, and in Moulmein there were 73 admissions for remittent and continued and 42 for intermittent fever.

8. These fevers have been made the subject of special investigation by Surgeon-Major Davis, the Superintendent of the Rangoon Jail, and a copy of his report referred to in paragraph 7 of the review of the Chief Commissioner has been received. Hitherto all these fevers have been considered as of malarial origin, but Dr. Davis has differentiated a chronic form of fever which, although partly malarial, as shown by the occasional presence of Laveran's bodies in the peripheral blood, is yet not affected by quinine, even when given in very large doses. As such cases subsequently developed scorbutic symptoms, vegetables and antiscorbutics, including lime juice were freely supplied, but without producing any beneficial results. It has long been suspected that the vegetables grown in the jail garden were deficient in antiscorbutic properties, and it had been observed, that when vegetables were obtained from a contractor, improvement in the symptoms had, followed. Fifty per cent. of the produce of the jail garden consisted of bajra, a vegetable of very low antiscorbutic value, and it is assumed that the other vegetables grown were more or less worthless as antiscorbutics, owing to over-production and high manuring. In September last, Dr. Davis substituted for these vegetables, the daily issue of ten ounces of potatoes to each prisoner, when the symptoms of scurvy gradually disappeared, and there were no further admissions for this particular form of fever. Dr. Davis is continuing his investigation, and the enquiry has been extended to the jails at Bassein and Moulmein. The etiology, symptoms and pathology of all fevers returned as remittent are deserving of a more scientific investigation than has hitherto been the case, and no better field exists for such investigation, than in the jails in India.

9. According to the figures in Statement XV (Vital) respiratory diseases were of exceptional prevalence in the jail at Myingyan, but judging from the remarks regarding the sickness in this jail at page 22 of the report, some of the cases of influenza may have been included among respiratory diseases. In the same statement five deaths are entered, as having occurred in the Bassein jail, from scrofula and phthisis pulmonalis, while only three cases were admitted into hospital. The figures regarding the Sande-way Jail in column 4 of Statement XIV are also incorrect.

ASSAM.

The sickness was less, but the mortality was greater among convicts than in 1894; the mortality has in fact been higher than in any of the previous ten years.

2. With daily average strength of 1,130 convicts in jails—not including those in lock-ups—there were 1,475 admissions into hospital, with 78 deaths, or a ratio of admissions per mille of average strength of 1,305.26; and of deaths 64.20. In 1894 the figures were 1,404 and 58.73 respectively. Of the 78 deaths in 1895, 36 were due to dysentery and diarrhoea, and 4 to anaemia and debility. Twelve prisoners were in addition released, on account of sickness, with a view to recovery. There was only one death from cholera, so that the high mortality does not appear to have been due to the special prevalence of any specific disease, but to the ordinary conditions of prison life.

3. The Chief Commissioner, in his review of the report, is of opinion that the excessive mortality was mainly owing to the absence of proper care in the selection of prisoners employed on extramural labour, and to insufficient attention having been paid to the food, water and clothing of those prisoners, while they were so employed.

4. These conclusions appear to be supported by the results in the past, and by the personal experience of the Chief Commissioner and other authorities. The rules now issued under paragraph 15 of the review, with regard to the working of the system of extramural labour in the four jails, where the mortality was highest, should be productive of the best results.

5. If the prisoners are fed and clothed in such a manner as to meet the requirements of the special kind of extramural labour on which they are employed in Assam, and if they are intelligently supervised, there appears to be no reason to object to their employment on such work. It is otherwise with the cultivation of paddy, which has been introduced into certain of the jails. It does not appear to be a suitable form of labour for prisoners in the physical condition of those admitted into the Assam jails, and the financial results, as given in paragraph 58 of the report, do not appear to be of such a nature as to warrant its being continued.

6. While fully admitting the distinct influence of extramural labour as at present conducted, in increasing the sickness and mortality, there are also, it appears to me, other factors at work. During last cold weather I had an opportunity of inspecting each individual prisoner in the jails at Gauhati, Tezporo and Dibrugarh. I found the large majority of them in a poor condition physically, and the state of their tongues and gums showed that they were more or less anæmic and scorbutic. These conditions were not associated with any appreciable disorders of the system; but their presence was a sufficient indication of indifferently health in the prisoner, and showed that the food was defective, either in quality or quantity. It is acknowledged that the prisoners on admission are in a low and anæmic state of health, perhaps to a greater extent than exists in any of the other provinces; but this is all the more reason for a modification of the ordinary prison diet—a diet which may be suitable for men in ordinary conditions of health, but which is not calculated to bring up anæmic and underfed individuals to the normal standard.

7. The scale of diet for labouring and under-trial prisoners is as follows:—

Rice	...	...	10 chittacks daily.
Animal food (chiefly fish)	...	2	,, 4 times a week.
Dal	...	2	,, daily.
Vegetables	...	2	,, "
Oil	...	$\frac{1}{2}$,, "
Salt	...	$\frac{1}{2}$,, "
Condiments	...	$\frac{1}{4}$,, "

An additional chittack of rice has lately been sanctioned for hill men and for Kacharis, Ravas and others of the Bodo race.

8. In the jails of Lower Bengal the scale of diet to labouring prisoners is as follows:—

Rice	...	...	11 chittacks daily.
Dal	...	3	,, "
Vegetables	...	3	,, "
Oil	...	$\frac{1}{2}$,, "
Salt	...	$\frac{1}{2}$,, "
Tamarind	...	$\frac{1}{4}$,, "
Condiments	...	$\frac{1}{4}$,, "

In addition to the above an early morning meal consisting of $\frac{1}{2}$ chittacks gram or 2 chittacks of rice and $\frac{1}{2}$ chittack of molasses or $\frac{1}{2}$ chittack of salt is issued.

Two chittacks of meat, fish or dal may, when necessary, be given on four days of the week instead of 2 chittacks grain.

Additions and substitutes to meet exceptional and varying circumstances appear to be freely allowed.

9. The rice, dal and vegetables in the Assam scale might with advantage be increased for labouring prisoners to the quantities given in Bengal, and particular attention should be paid to the quality of the vegetables and condiments supplied.

10. If the table of diets for the natives of Behar and the North-Western Provinces, shown in Statement IX, is correct, the distribution of the meat and dal is rather peculiar, as only one chittack of dal is given on four days of the week, at the evening meal, and on the other three days two chittacks of dal and two chittacks of meat are given, in addition at the morning meal. The Jail Committee of 1864, on whose recommendations the diet is apparently based, approved of the issue on four days of the week of two chittacks of meat and one chittack of dal, and on the other three days of 3 chittacks of dal. The complicated manner in which Statement IX is drawn up, is very confusing, and the figures referred to may have been misplaced in the printing, but they are similarly arranged in the statement of the previous years.

11. In paragraph 65 of the report the value of the vegetables grown in the jail gardens is estimated at Rs. 5,072-8-6. The quantity supplied to the prisoners was valued at Rs. 2,911-1-6, and the balance Rs. 2,791-7-0 was realized by the sale of vegetables to the public.

12. The issue to the prisoners of two chittacks of vegetables daily was, evidently, both from the appearance of the prisoners, and from the experience gained in other provinces, not sufficient to meet the requirements, and it seems desirable to limit the sales, and increase the amount supplied to the prisoners. Besides, with such large sales, there is a tendency to sell the better class of vegetables, and reserve the inferior for the inmates of the jail.

13. Although the cost of clothing is comparatively high, viz., Rs. 5-8-0 per head of average strength, yet it must not be inferred that the prisoners are better clothed than elsewhere. Blankets, etc., are more expensive in Assam than in Bengal, and as a matter of fact only two blankets are issued to each prisoner during the cold weather months. Judging from the construction of the jails, and from my personal experience of the cold season in Assam, I would conclude that the bedding supplied does not afford sufficient protection against the cold. The Chief Commissioner in the instructions, referred to above, has directed that special attention should be paid to the quality and quantity of the bedding issued to the prisoners in the four jails alluded to. It would, however, be desirable to lay down definite rules on the subject, applicable to all the jails.

HYDERABAD ASSIGNED DISTRICTS.

With an average daily strength of 1,318 prisoners of all classes, there were 1,171 admissions into hospital, with 33 deaths, or a ratio per mille on average strength of 887.91 and 25.02, respectively. These results were more favourable than in the previous year when the ratios were 1,354.3 and 30.3.

2. The highest mortality occurred in the Akola Jail, where, with an average strength of all classes of 517, there were 20 deaths, or a ratio of 38.68 per mille on average strength.

3. The average ratio of deaths in all the other jails was 16.21.

4. The medical officer ascribes the high mortality in the Akola Jail to overcrowding, and to the advanced age of a number of the prisoners, ten of those who died, being above 55 years of age. There is, however, always a certain percentage of aged individuals in all jails, and with regard to overcrowding, the figures given in Statement XIV (Vital) show that there is accommodation for 545 inmates, exclusive of the hospital and observation cells, which together can accommodate 88 prisoners. The average daily strength of all classes of prisoners was 517.09, the daily average sick was 15.90, so that the daily average number occupying the barracks was 501.19. The maximum population on any one day was 555. In the sanitary sheet of this jail, the medical officer states that no particular ward was overcrowded, and that those for male adults had their full complement almost throughout the year. I must, therefore, agree with the Resident and Commissioner that the unhealthiness of the jail could not be due to overcrowding.

5. The chief causes of the sickness and mortality, more particularly the latter, were as follows:—12 admissions with 3 deaths for anaemia and general debility, 42 admissions with 5 deaths for respiratory diseases, including 16 admissions with 3 deaths for pneumonia, 52 admissions with 4 deaths for dysentery and diarrhoea, 7 admissions with 3 deaths for scurvy, and 31 admissions for ulcers and boils.

6. In the previous year more than half the total deaths—20 in 39—in all the jails occurred in the one at Akola, and from somewhat similar causes. In 1893 the inmates were largely affected with scurvy.

7. In the jail at Amraoti, which in respect of population and surroundings is somewhat similar to the one at Akola, the ratio

of deaths was only 15.14. The authorized scale of diet appears to be sufficient to meet all ordinary requirements, and although the cost of dieting charges was in Amraoti only Rs. 19-14-6 per head and in Akola Rs. 23-7-1, yet in the absence of adequate reasons accounting for the mortality, and judging from the data given above as to its causes, combined with the previous history of the jail, it must be inferred that the prisoners were insufficiently nourished. This may have been due to defects, either in the quality or quantity of the grain foods, combined with imperfect cooking. The vegetables, condiments and antiscorbutics, if supplied in sufficient quantities, must have been of inferior quality. The indifferent water-supply in the last quarter of the year doubtless increased the sickness, but no attempts appear to have been made to improve it.

8. Every endeavour should be made to improve the gardens at Akola, Amraoti, Ellichpur and Buldana, so as to ensure a plentiful supply of the best vegetables and antiscorbutics.

COORG.

There is only one jail, that at Mercara, dealt with in this report.

2. The average daily strength, including under-trial and civil prisoners, was 116.66. There were 5 deaths, one occurring among the under-trial prisoners.

3. The only point calling for notice is that there are two scales of diet for labouring prisoners, one for males sentenced to three months and under, and the other for those above three months. There appears to be no great object gained in thus discriminating between the two classes. Physiologically, both require the same quantity of food, and the effects of a reduced diet, continued for three months, may affect the individual after his release from jail, although the results do not appear in the returns.

GENERAL REMARKS.

The sickness and mortality among convicts in the different groups of jails are shown collectively in the following table, arranged according to the ratio of mortality in each:

2. An uniform death-rate among jails distributed over such a wide geographical area, and placed under such different climatic conditions, could hardly have been expected, but with all the experience and knowledge we have gained regarding the management of jails, it might have been hoped, that there would not have been such variations in the results as are shown in the above figures.

3. Scarcity and the prevalence of endemic and epidemic disease among the free population undoubtedly affect the sickness and mortality in jails, as the former has done in the past year in those of the Central Provinces, but with the inmates of jails and their surroundings completely under control, it would have been expected that the practical benefits accruing from efficient sanitation and trained supervision, would have been exemplified in a more striking manner, than has been the case in some of the jails.

4. After a careful study of the chapter on vital statistics in the different reports and of their attached statements, I think that the remarks of the Inspector-General of Prisons, Madras, quoted in the note on the jails under that officer, must be accepted as generally applicable to the prisoners in Indian jails, and that the mortality must to a great extent be taken as an index of the care bestowed on the preparation and on the cooking of the food.

5. The authorized scale of diets in use may be quite sufficient for healthy men, but a large number of the admissions are soldon in that condition, and the diet must be modified or supplemented to suit their particular physiological wants.

6. It would be of advantage if Inspector-Generals not together occasionally to discuss jail matters, and had an opportunity of interchanging their views on subjects in which they are particularly interested. Officers in the department might also be permitted to visit jails in other provinces and make themselves practically acquainted with the different systems in vogue. They would then see for themselves those details of management which conduce to efficiency, and which tend to improve the health of the prisoners.

7. I would take this opportunity of referring to the cases and deaths returned in the different statements under the heading "Remittent fever." In many instances no *post-mortem* examination was made, and in others the notes regarding the examinations are so incomplete, that they are comparatively useless, except to show that an error was made in the diagnosis. In nineteen cases at least, there was evidence that death was due to specific organic disease, yet no correction was made in the diagnosis and the deaths were returned as due to remittent fever.

8. The details of *post-mortem* examinations in other cases are also very unsatisfactory, and the *post-mortem* appearances in cases of dysentery and diarrhoea are, as a rule, described in such a superficial and cursory manner, as to be of no scientific value.

JAMES CLEGHORN,

Director-General, Indian Medical Service.

18th August 1896.

Local Government and Administration.	Average daily strength of convicts.	Number of admissions to hospital.	Daily average sick.	Ratio per mille of daily average sick to average daily strength.	Total number of deaths in and out of hospital.	Ratio per mille of deaths in and out of hospital to average daily strength.	Admission-rate from dysentery and diarrhoea per mille of average daily strength.	Percentage of deaths on number of cases admitted for dysentery and diarrhoea.	Number of prisoners released on account of sickness.
Burma ..	13,220	11,781	509	38	227	17.17	153	2.02	15
Madras Presidency ..	8,564	6,103	214	25	165	19.26	134	4.16	6
Punjab ..	10,060	15,885	384	36	235	22.05	183	1.32	4
Bihar ..	1,247	1,140	80	24	82	25.64	81	4.05	2
Bengal ..	15,529	19,582	676	43	418	26.9	365	2.73	57
N.-W. Provinces and Oudh	30,575	26,675	1,793	59	836	27.34	114	9.4	5
Bombay Presidency	7,261	7,469	239	33	223	30.7	125	7.94	8
Coorg ..	108	64	2	17	4	36.87	184	5.00	0
Central Provinces ..	4,648	4,437	109	36	268	57.65	212	14.40	2
Assam ..	1,313	1,757	81	61	81	61.08	575	7.31	12
TOTAL FOR BRITISH INDIA	93,125	94,803	4,127	44	2,189	26.73	179	5.16	111

NOTE ON THE CASES REPORTED AS PLAGUE IN CALCUTTA.

BY THE CALCUTTA MEDICAL BOARD.

The following eleven cases have been reported to the Medical Board as cases of bubonic plague in Calcutta, besides certain cases in the Fort, which, on enquiry, proved to be ordinary non-venereal buboes:—

- * One case in Howrah.
- * One case in Chatawallah Lane.
- * Two cases in Manicktolla Hospital.
- * Two cases in the Presidency General Hospital.
- * One case in Raja Raj Bullub Street.
- * One case in Armenian Street.
- * One case in Woolladanga.
- * One case in Garden Reach.
- * One case in Warris Bagan Lane.

In the cases marked with an asterisk, the plague bacillus is said to have been found in the blood of the persons attacked. Three others were found to be cases of simple enlarged glands, fever and bronchitis and intestinal obstruction respectively. The result of the examination of the blood of the two cases in the Presidency General Hospital is not known to us. As a full history of all these eleven cases is contained in the appendix to this report, it is not necessary to recapitulate them here, and a summary of the conclusions drawn from these will, therefore, be sufficient in this place.

The bacillus is also said to have been identified in the case in Raja Raj Bullub Street which terminated fatally. This case was first reported by a homoeopathic practitioner to the Health Officer of Calcutta by postcard on the evening of the 2nd November. It was seen by Drs. Cobb and Simpson on the 3rd at 5-30 P.M., and the man died in their presence at 6-30 the same evening. They reported it "as a fatal case of true plague." The Board of Health did not hear of this case till the following day, after the body had been disposed of, and then only from private information. An interval of nearly 20 hours occurred between the time the case was first seen by the homoeopathic practitioner and the time it was inspected by Drs. Cobb and Simpson. It is to be regretted that Drs. Cobb and Simpson did not call in one of the medical members of the Board, who would have been only too willing to go and see "a true case of plague." The omission is

the more unfortunate, because doubt had arisen in the public mind regarding the diagnosis of the previous cases. Drs. Dyson and Robson-Scott, however, as soon as they heard of the case, proceeded to the spot and made minute enquiries concerning it, with the result that it was clear that other reasons existed for the enlargement of the glands in the groin, which was reported to be one of the prominent features of the case.

The most noticeable point in the suspicious cases that have occurred is the fact that all the patients in whose blood the plague germ is said to have been found recovered, with the single exception of the case in Raja Raj Bullub Street, and in this case, as already stated, the symptoms noticed can reasonably be ascribed to other causes. Another remarkable fact is that none of these six sporadic suspicious cases produced any infection either in the neighbourhood or even amongst the people who attended the sick.

Looking only to the clinical symptoms set forth in the appendix to this report, we have no hesitation in expressing our emphatic opinion that none of these cases, including the fatal case of Bipin Behari Dutt, can properly be described as cases of bubonic plague. It may be inferred, however, from the reports which have come before us, that the diagnosis made by the Health Officer and Dr. Cobb is based not so much upon the symptoms of the patients as upon the supposed presence in their blood of a microscopic organism stated to be "the plague bacillus." We propose, therefore, to examine the evidence bearing on this point, and to state how far the conclusions arrived at by Drs. Cobb and Simpson are borne out by the independent investigations carried on by our colleague, Dr. Cunningham.

Dr. Cunningham has received from M. Haffkine a type-culture and several microscopic preparations of the plague bacillus as occurring in Bombay. These agree in their characters with those described as characteristic of the plague bacillus as found in China, and there can be no reasonable doubt that the Bombay bacillus is the same as that which is regarded by M. Yersin and Professor Kitasato as the specific cause of plague.

Dr. Cunningham has also personally obtained 20 microscopic preparations and 15 cultures of blood from seven distinct cases of supposed plague, six of which occurred among men in the Shropshire Regiment. The microscopic preparations show nothing, except that some of the subjects suffered from anæmia; while the cultures have without exception remained absolutely sterile.

A series of cultures and preparations of local origin was received by Dr. Cunningham from Drs. Simpson and Cobb. None of these exhibit the characters of the standard type. In one instance only does the growth in the form of colonies present some similarity to that of the type specimen; but in this case the microscopic characters do not resemble those of the Bombay bacillus. In another case the culture yielded an absolutely pure growth of a large *staphylococcus*, which is of common occurrence in the air; while the corresponding blood preparation showed evidence of contamination from other sources in the presence of a certain number of slender bacilli. In a third culture there was a pure growth of a form of *schizomycete* or fungus, of which neither the colonies nor their constituent elements bore the remotest resemblance to the plague bacillus. A fourth culture prepared from the blood of Bipin Behari Dutt contained large bacilli, probably of a putrefactive character, along with minute cocci and diplococci; but in the microscopic preparation of the blood only the large bacilli could be recognised. The remaining cultivations of local origin are pure cultivations of cocci and diplococci not agreeing in character with the type specimen, and not distinguishable from forms which are liable to occur in and on almost any organic medium as the result of contamination. As the phenomena of three out of the four cases expressly referred to above furnish conclusive evidence that actual contamination occurred, there is no certain proof that in the remaining cases the minute organisms discovered were really derived from the blood.

(To be continued.)

Correspondence.

HYDATID CYSTS.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—With reference to the case of hydatid cyst reported by Surgn.-Capt. Buchanan in your issue of November I wish to say that a few years ago I removed a hydatid cyst from a native of India. The cyst was situated in the muscles of the back. The patient was a Hindu of the cooly class, and from his circumstances I think it highly improbable that he had ever left the country, but of this I cannot be absolutely certain. In the Museums of the Madras Medical College there are two specimens of hydatid cyst removed from natives of India, one specimen of hydatid of the abdomen, the other of the liver. In 1894 Surgn.-Capt. C. L. Williams, then pathologist to the Madras General Hospital, removed, *post-mortem*, a number of hydatids from the abdomen of a native. In none of these cases is there any note as to whether the subjects had ever been outside India.

MEDICAL COLLEGE, MADRAS,
14th December 1896.

J. MAITLAND,
Surgn.-Lt.-Col.

KALA AZAR.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—In the communication from Surgn.-Capt. P. W. O'Gorman in your issue for November regarding *kala azar* I see no mention of the fact of his having made use of the microscope in his search for *anchoylostomata*. If, instead of straining the motion and examining them microscopically, he examines them microscopically according to the directions given by Sansino in *Hyg. and Dis. of Trop. Climates* he will very soon ascertain, I feel certain, that the parasite, as evidenced by its ova, is present in a large percentage of the cases. In the General Hospital here we find them present in by far the larger number of cases of anæmia whether they come from the East Coast or West Coast. I suppose few doubt now that *kala azar* is not a specific disease entity but that it is a more or less comprehensive term for the various forms of debility depending upon malarial poisoning, anchylostomiasis and other parasitic anæmias, mal-dieting, etc., towards the production of which one or more of these etiological factors contribute in varying proportions under different conditions of environment.

I may, add that a considerable experience of the thymol method of treatment has not furnished any evidence of danger or even dislike to its use amongst those to whom it has been given.

MADRAS:

1st December 1896.

A. E. GRANT,

Surgn.-Capt., I.M.S.

THE INCREASE OF ENTERIC FEVER IN INDIA.

SIR,—In the December number of the *Indian Medical Gazette*, Surgeon-Captain Leonard Rogers, I.M.S., in a letter on the above subject appears to lean to the view that many of the cases now returned as enteric fever would be more fittingly classified under the head of simple continued fever.

Believing as I do, that the revival of this once cherished theory would have pernicious effects on the well-being of the soldier and on the credit of Indian medicine, I should like to make some remarks on the other side of the question. Any one who has had the opportunity of watching the course of an epidemic of enteric fever at home and of treating groups of cases from the same street, perhaps from the same household, must have been struck by the great variation among the cases as regards severity and mildness, and varying predominance of symptoms. There seems to be no reason why mild, ill-defined cases of enteric fever should be recognized in England, and not recognized in India. The whole tendency of recent investigations on the specific fevers is to recognize more than formerly the existence of a fringe of blurred, ill-defined cases in all of them. The term "Simple Continued Fever" is a phrase which covers cases of fever symptomatic of slight local ailments, cases of ephemeral fever due to exposure to the sun, ill-defined cases of malarial fever, and mild cases of enteric fever. If it were expunged from the nomenclature, no harm would be done. To apply the term to cases where the temperature remains elevated for two or three weeks, is to misapply it.

"Thomas Atkins" seems to have grasped this when he interprets the heading "S. C. Fever" as "the low continuous fever." Its use tends to laxity of diagnosis, and laxity of diagnosis means that the dejecta of ill-defined cases of enteric fever are not systematically dealt with, and hence methods of prevention do not get fair play.

Finally, Surgeon-Captain Rogers' reasoning that "the very low mortality of simple continued fever seems to point to many of the cases returned as enteric not being cases of that disease" rests on a fallacy. In the British Service *post mortem* examinations are made in all cases. Hence, if death occurs in a case of indefinite fever returned as S. C. Fever, and the *post mortem* reveals evidences of enteric fever to the death will be shown under the heading of enteric fever, thus increasing the rate of mortality shown from that disease, while the milder cases which recover swell the S. C. Fever list.

20th December, 1896.

A. M. S.

THE HOWRAH CASE.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—In your November issue appeared a paper by Drs. Cobb and Simpson giving an interesting historical account of the "Bubonic Plague," and containing notes of cases which they believe to have been cases of 'plague.' I am only concerned with one of these cases, that of Mr. J. C., who was for a time under my care in the Howrah General Hospital. In the notes of his case it is stated that there was no history of venereal disease, but as this mistake was corrected by a letter from the Inspector-General of Civil Hospitals published in the same issue I do not think that I need say anything about the matter. Nor should I have thought it necessary to write this letter, but for the appearance, in

the *Indian Medical Gazette* for December, of further notes on the case of J. C. from Surgeon-Lt. Col. A. Tomes, from whom I took over the case. Dr. Tomes ignores the question of possible venereal infection and states with emphasis, which leaves no room for doubt, that in his opinion J. C. suffered from "*Pestis Ambulans*."

The preliminary history given by Dr. Tomes does not exist in the records of the case in the Howrah Hospital. For when I took over charge of the case on October 14th there was no history on the bed-head ticket, and I made careful enquiries from the patient and his friends with a view to supplying this deficiency. As the case was an important one in many aspects, I went at once to Dr. Simpson's laboratory and he with great courtesy showed me the specimens of diplo-bacteria taken from the blood of J. C. I saw also the bacilli found in the blood of patients in Bombay. The bacilli said to have been found in the blood of J. C. did somewhat resemble those of the Bombay cultures; more than that I am not prepared to say. At my request tubes of *agar-agar* and *bouillon* were inoculated by Surgn.-Capt. Vaughan with blood taken from J. C.'s finger. Nothing even grew in these tubes, nor were bacilli found in the blood. The clinical symptoms were in my opinion not those of '*plague*,' nor was there any sign of infection among those with whom the patient had freely mixed during the early part of his illness and there was a very clear history of possible venereal infection. However, as the case was a doubtful one, the patient was kept isolated until after a further bacteriological examination had been made by Dr. D. D. Cunningham. This examination produced no positive results. I then on my own authority removed J. C. to the Howrah General Hospital and removed the suppurating glands from both groins. When I left Howrah in November the wounds were healing rapidly and J. C. was in very good health. I will now insert a copy of the *previous history* of the case as it stands on the records of the Howrah General Hospital:—"Patient states that while in Bombay he had connection with a prostitute on the 11th or 12th of September last and about the 16th or 17th he noticed 4 small pimples on the prepuce. These broke down and formed open sores (small). Two or three days after this the glands in both groins became painful and a little enlarged. He left Bombay on the 23rd and arrived in Howrah on the 26th. On the 28th he had little 'fever.' He came as an out-patient on the 2nd of October and after applying the 'Blackwash' prescribed for him the sores healed in 3 or 4 days, but the glands kept on getting larger and more painful. No other glands in the body were affected and slight fever continued. His appetite remained good all the while, and he always felt cheerful and was able to go about the house. He attended this Hospital [as an out-patient] on 3 or 4 occasions, the last visit was on the 7th October."

The rest of his history is well known. I am sorry that I cannot attach as much importance to the presence of bacteria in J. C.'s blood as Dr. Tomes seems to do. It is permitted that among medical men there should be difference of opinion, and I do not think that the proof that J. C. suffered from '*Pestis Ambulans*' was conclusive. This letter is not written in any spirit of contradiction, but with a view to a fair representation of another view of the case which I believe to have been of a venereal nature.

MIDNAPUR,
December 14th, 1896.

J. H. TULL-WALSH,
Surgeon-Major.

NOTES ON AN UNUSUAL CASE.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—In sending you the following notes on an unusual case, I do so hoping that others who may have met with similar conditions may publish their observations, diagnosis and any treatment they found useful.

A sepoy in the regiment under my charge, a Punjabi Mussalman *et. 20*, of good physique and healthy appearance, came to hospital on the 11th April 1896 at Quetta complaining of severe pain with swelling of left upper arm.

On examination it was found that the left upper arm was occupied by a fusiform swelling, encircling the humerus; it was slightly hotter than other limb, exceedingly tender, and uniformly very hard.

The skin was movable over the swelling, but it appeared to be firmly fixed to the bone, and to consist of all the structures between skin and bone in one mass. Voluntary flexion of the elbow was impossible, and forcible flexion very painful.

His temperature was 99.4. On measurements being taken it was found that the circumference of the arm just above the elbow was 11½ inches in middle, 12½ inches at insertion of pectorals, across the deltoid 11½ inches and on level of insertion of deltoid 11½ inches.

His measurements on sound right arm were 10½ above elbow and 11½ in middle of arm. His temperature during the evening rose to 101.2. Hot fomentations and belladonna and glycerine applied.

On the 18th April still extremely painful; impairing rest at night; says if anything pain is slightly worse at night; swelling larger,

This state continued with slight variations in size, and my opinion was after measurements that the increase being slight and the maximum circumference shifting its position, that it was not malignant in character. There were signs of inflammation, and no cachexia or enlargement of glands.

On the 18th April, having come to the conclusion that it might be a diffuse periostitis (though no cause was apparent) with implication of surrounding muscles in the inflammation, an incision was made 3 inches long over the back of arm between the two heads of triceps; (as the bone appeared nearer surface here than elsewhere) the bone was exposed with a view to doing a linear osteotomy to remove tension. With the exception of slight roughening of the surface, the bone was found to be healthy, and there was no inflammatory exudation beneath the periosteum. The muscle cut into was pale yellowish pink—very hard, almost cartilaginous, in consistence—yet its fibres could be clearly seen, and there were no signs of any infiltration by new growth or any abnormal moisture exuding from cut surface; in fact, it was unusually dry, and no blood coloured serum exuded.

Unfortunately a piece was not removed for microscopical examination. The wound was closed by sutures.

No rise of temperature or other untoward symptom followed; on the 24th April the swelling moved from middle of biceps to 2 inches higher up the arm, and the circumference at that spot was then 13½ inches. Pain was most severe here, and the swelling was extremely hard as before. No relief obtained from anything administered, as potassium iodide, mercury and arsenic.

On the 26th the maximum swelling is now 14 inches, and is in the same situation as in last note, and the (?) inflammation has spread to the pectoral muscles of left side which are intensely hard as though firmly contracted. On the 15th May, the pectoral muscles had almost resumed their normal consistence, but a hard lump about size of a hazel-nut has appeared at insertion of pectorals into humerus. The swelling still remains about the belly of biceps and upper part of upper arm, but is smaller in circumference and softer in consistence, and its maximum circumference shifts its position, sometimes being greater in upper part of biceps, and then in lower part of the same muscle, while all the time the remaining part of upper arm remains hard.

On the 19th May: Now there is a large lump about size of a pigeon's egg firmly fixed in situation of the insertion of pectorals, and above and below this the muscle is softer.

On the 30th May: The swelling has now shifted to insertion of deltoid; the remaining part of upper arm is less painful and becoming softer.

On the 10th June: Not much change; swelling still localised to middle of upper arm about the insertion of pectorals, occasionally extending into chest origin of pectorals.

On the 13th June: Now there is a large hard egg-shaped lump at lower end of biceps just above the elbow joint, hot and very tender and hard. Remaining muscles of upper arm are becoming flaccid.

On the 18th June: Was discharged from hospital to-day having been in over two months. Movements of arm fairly good. Muscles wasted from disuse, slight pain in upper and middle part of upper arm and at seat of incision. Still a hard lump in biceps above the elbow but smaller, and elbow can be flexed fairly well.

Up to date of writing this (August 26th) he has not reappeared in hospital, so it may be taken that he can perform his duties well, and that no acute symptoms have returned.

The measurements taken are as follows:—

	2" above point of elbow.	High up to a Middle of arm, bill or across deltoid.	At insertion of deltoid.
11th April—			
Sound arm, right...	10½"	11½"	11"
Diseased arm, left	11"	12½"	11½"
12th April	11½"	12½"	11½"
13th " Diseased arm	10½"	12½"	11"
14th " "	11½"	13"	11½"
15th " "	11"	12½"	11"
16th " "	11½"	13"	12"
18th " "	11½"	12½"	12½"
24th " "	11"	12"	13½"
26th " "	10½"	11½"	11½"
13th May	9½"	10½"	10"

After this measurements were not taken. The disease was first diagnosed as periostitis, but without any particular reason beyond the extreme hardness and pain, which on firm pressure was slightly relieved, and the apparent adherence of muscles and bone in a mass which appeared to be near surface.

The disease was subsequently (after the incision had been made) changed to inflammation of muscle (of arm and pectorals) for want of a better diagnosis. The curious points about this case are (1) its rarity,—I cannot find such a case mentioned in any work, and never saw or heard of a previous case of the kind; (2) its origin without any apparent cause, except a possible strain in gymnasium; (3) its shifting character remaining at first localised to muscles of upper arm. Biceps, brachialis, anticus triceps, and finally getting to deltoid and pectorals,

No treatment was apparently of any use, though local fomentations perhaps mitigated the pain. It arose by itself, and apparently departed by itself.

There was no suppuration at any time or signs of any entozoon, and no disturbance of general system beyond the first rise of temperature.

If anyone can suggest a probable cause, it would be interesting. I suppose there is no doubt it was a form of myositis.

JACOBABAD: } ARTHUR F. W. KING, I.M.S.,
21st October 1896. } Surgeon-Lieutenant.

Note.—The man was seen on the 29th August 1896, arm perfectly free from any swelling or stiffness; muscles soft; scar not painful.

Reviews and Notices of Books.

ROYAL INFIRMARY CLINQUES. BY ALEXANDER JAMES, M.D., F.R.C.P.E. Oliver and Boyd, Tweeddale Court, Edinburgh, 1896.

OWING to the intrinsic character of this book its circulation must be somewhat limited,—confined chiefly to students, and more especially to those attending the clinical lectures delivered at the Edinburgh Royal Infirmary. Dr. James has published these lectures for the purpose of obviating the need of note-taking at his clinics, and for this kindly forethought his students should be duly grateful. He treats of a variety of subjects in a series of sixteen lectures, commencing with empyema and fibroid phthisis, and ending with a lesion of the Pons Varolli and Addison's Disease.

The word "GENTLEMEN," which prefaces each case, becomes somewhat monotonous after sixteen repetitions, and might, with advantage, be omitted as superfluous. The diagrams and illustrations are all clear and well-executed, and there are not too many of them as is so apt to be the case with latter-day publications. In the diagram on page 25, however, the letters indicating "right" and "left" have been transposed by mistake. The book is beautifully bound and printed, and does the publishers much credit. From its exterior it looks more like a book of poems for the drawing-room table than a medical book for students. This is a change for the better that we gladly welcome, for the appearance of too many of the text-books of our student days used to be most unattractive, even forbidding in some instances.

The description of the mechanism of a pulsating empyema is well explained. There are some interesting observations on the diurnal and nocturnal excretion of urino as bearing on the diagnosis of renal and cardiac disease. The author regards primary contracting kidney as a degenerative rather than an inflammatory process, and believes the "senile kidney" to be the result of slow failure of nutritive power.

Dr. James gives statistics to show that the number of cases of Diabetes Mellitus treated in the Edinburgh Royal Infirmary has increased much of late years, and suggests that this augmentation is intimately associated with the prevalence of epidemic influenza. Attention is directed to the exaggeration of the superficial reflexes, and to the diminution or even absence of the deep reflexes, as features common in diabetic cases. Cirrhosis of the liver in children is described by Dr. James as "distinctly uncommon," and he hints that it is in some way related to tubercular disease. The disease may be uncommon in Edinburgh; but this statement cannot be said to hold good in India, especially in Calcutta. The author, however, displays a blank ignorance of the work of Surgeon-Major Gibbons, I.M.S., on the Interlobular Cirrhosis of the Liver in Children, vide his publications in *The Scientific Memoirs by Medical Officers of the Army of India, in the Transactions of the Indian Medical Congress*, and in the *Proceedings of the Calcutta Medical Society*. This is a common example of the manner in which medical work done in India is ignored at home. Editors of medical journals at home cry out that medical men in India do no original work; but, as a matter of fact, they rarely trouble themselves to read what is written by men in India.

The same observations may be made of the next paper on "A case of Dysentery treated by Deemetised Ipecacuanha." The author seems to be conversant with only one paper on the use of this drug.

In his case of Aortic Aneurism Dr. James makes a special reference to the sensitive, or painful areas of the skin associated with irritation of the first three or four dorsal segments of the spinal cord. The case of Epilepsy is interesting, in that the boy could sometimes prevent the occurrence of a fit by tightly grasping the leg above the knee as soon as he felt the aura commencing in the ball of his great toe.

The remaining lectures on Spinal Injury, Friedreich's Ataxy, Combined Paralysis of the Nerves of the Arm, Pons Lesion, and Addison's Disease are all worth perusal. Probably the best feature of this book is the excellent form of case-taking adopted in describing the cases. It is one that students may imitate with advantage to themselves and to those who have to read their notes.

Appointments, Leave, &c.

BENGAL.

Assistant-Surgeon Uma Churn Roy of the Jessoro Dispensary, held medical charge of the Civil Station of Jessoro, in addition to his own duties, from the afternoon of the 18th October to the forenoon of the 3rd November 1896.

With effect from the date on which he was relieved of his appointment as Officiating Second Resident-Surgeon, Presidency General Hospital, Surgeon-Captain F. O'Kinealy is appointed to do general duty at the Presidency until further orders.

Surgeon-Captain D. M. Moir, Second Resident-Surgeon, Presidency General Hospital, is appointed to act as First Resident-Surgeon of that Institution, during the absence, on leave, of Surgeon-Captain H. W. Pilgrim, or until further orders.

Surgeon-Captain F. O'Kinealy, on general duty at the Presidency, is appointed to act as Second Resident-Surgeon, Presidency General Hospital, during the absence, on deputation, of Surgeon-Captain D. M. Moir, or until further orders.

Surgeon-Major G. Jameson, Civil Surgeon of Tippora, is appointed, on return from furlough, to act as Civil Surgeon of Nadin, during the absence, on deputation, of Surgeon-Major J. Clarke, or until further orders.

Assistant-Surgeon Jogendra Nath Boso made over charge of the Puri Jail to Surgeon-Captain N. P. Sinha on the forenoon of the 9th November 1896.

Assistant-Surgeon U. Chandra Banerjee is allowed leave for one month under Article 369 of the Civil Service Regulations, and two months under Article 372 of the Regulations, in continuation of leave on medical certificate granted in Medical Department Notification No. 4342, dated 15th May 1896.

Assistant-Surgeon Kristo Churn Bose, a supernumerary at the Presidency, is appointed to do supernumerary duty at the Mitford Hospital, Dacca, until further orders.

Assistant-Surgeon Hira Lal Dutt, a supernumerary at the Medical College Hospital, Calcutta, is appointed to have medical charge of the Demagri outpost in the South Lushai Hills, *vice* Assistant-Surgeon Baroda Kanto Roy.

Surgeon-Lieutenant-Colonel J. Moorhead reported his departure from India on furlough on the 18th November 1896.

Surgeon-Captain J. C. S. Vaughan, Deputy Sanitary Commissioner, Western Bengal Circle, is placed on special duty in connexion with anti-cholera inoculation.

Surgeon-Lieutenant E. S. Peek, on special duty under the Medical Board, is appointed to act as Deputy Sanitary Commissioner, Western Bengal Circle, during the absence, on deputation, of Surgeon-Captain J. C. S. Vaughan, or until further orders.

Second Class Military Assistant-Surgeon J. C. Gillmon, Medical Officer at the Sandheads, allowed leave for two months, one month under Article 276A, and the other under Article 291, of the Civil Service Regulations, with effect from the date on which he availed himself of it.

Second Class Military Assistant-Surgeon P. Victor, Supernumerary, Presidency General Hospital, is appointed to act as Medical Officer at the Sandheads, during the absence, on leave, of Second Class Military Assistant-Surgeon J. C. Gillmon.

Surgeon-Captain F. J. Drury, Resident Physician, Medical College Hospital, and Professor of Pathology, Medical College, Calcutta, acted as Professor of Materia Medica and Clinical Medicine and Second Physician of the Medical College Hospital, and also as Medical Inspector of Emigrants (Inland Emigration), in addition to his own duties, from the forenoon of the 26th August to the forenoon of the 12th October 1896.

Assistant-Surgeon Jogendra Nath Ghosh, of the Motihari Charitable Dispensary, held medical charge of the civil station of Champaran, in addition to his own duties, from the 11th to the 26th November 1896, both days inclusive.

Brigade-Surgeon-Lieutenant-Colonel W. H. Gregg, Civil Surgeon of Burdwan, is, under orders of the Director-General, Indian Medical Service, attached to the office of the Principal Medical Officer, Presidency District, Calcutta, for a period of two months.

Surgeon-Captain W. J. Buchanan, Officiating Superintendent of the Bhagalpur Central Jail, is appointed to act as Civil Surgeon of Burdwan, during the absence, on deputation, of Brigade-Surgeon-Lieutenant-Colonel W. H. Gregg, or until further orders.

Surgeon-Captain B. C. Oldham, Officiating Superintendent of the Presidency Jail, is appointed to act as Deputy Sanitary Commissioner, Metropolitan and Eastern Bengal Circle.

Surgeon-Lieutenant-Colonel J. Moorhead is allowed furlough for one year six months and twelve days, under Article 340 (b) of the Civil Service Regulations, with effect from the 17th November, 1896.

This cancels the Notification No. 4244 Med., dated the 16th November 1896.

Surgeon-Captain H. W. Pilgrim reported his departure from India, on furlough, on the 24th November 1896.

In supersession of the Notification No. 4683 Med., dated the 7th December 1896, Military Assistant-Surgeon P. Fitzpatrick of the Presidency General Hospital, is appointed to act as Medical Officer at the Sandheads, during the absence, on leave, of Second Class Military Assistant-Surgeon J. C. Gillmon.

Second grade Assistant-Surgeon Chuni Lal Bose, Additional Chemical Examiner to Government and Assistant Professor of Chemistry, Medical College, Calcutta, is promoted to the first grade, with effect from the 1st October 1896, in accordance with the orders of the Government of India, Home Department, No. 352, dated the 8th July 1881.

BOMBAY.

Brigade-Surgeon-Lieutenant-Colonel S. M. Salaman, Superintendent, Yeroda Central Prison, is appointed to be a nominated commissioner of the Poona Suburban Municipality, *vice* Surgeon-Captain Jackson, resigned.

Assistant Surgeon Behramji Hormasji Nanavati, L.M. & S., is allowed leave on medical certificate for two months, from 1st November 1896.

Assistant-Surgeon Ardesar Manokji Dotivala, L.M. & S., has been appointed to act as Teacher of Surgery and Midwifery, Bohramji Jijibhai Medical School, Ahmedabad, with effect from November 1st, 1896, forenoon, during the absence of Assistant-Surgeon Behramji Hormasji Nanavati.

Surgeon-Captain E. G. R. Whitcombe has been appointed to act as Civil Surgeon, Jacobabad, in addition to his own duties, with effect from the 23rd October 1896, forenoon.

Surgeon-Captain J. L. T. Jones and Surgeon-Major J. W. T. Anderson, respectively delivered over and received charge of the Adon Prison, on the 12th November 1896, before office hours.

Rao Bahadur R. S. Jayakar and Brigade-Surgeon-Lieutenant-Colonel C. T. Peters respectively delivered over and received charge of the Dharwar Prison, on the 20th November 1896, after office hours.

Surgeon-Lieutenant-Colonel H. McCalman and Rao Bahadur R. S. Jayakar respectively delivered over and received charge of the Dharwar Prison, on the 17th November 1896, after office hours.

The undermentioned Assistant-Surgeons have been placed at the disposal of the Municipal Commissioner for the City of Bombay for duty in connection with the Bubonic Plague with effect from the dates marked against their names:—

Assistant-Surgeon Varjivandas Damodardas Morehant, L.M. & S., 2nd October 1896.

Assistant-Surgeon Kastamji Jamshedji Potigara, L.M. & S., 2nd October 1896.

Assistant-Surgeon Rastamji Jamshedji Kapadia, L.M. & S., 22nd October 1896.

Assistant-Surgeon Shapurji Manokji Mohta, L.M. & S., 22nd October 1896.

Bombay Volunteer Rifle Corps.—Surgeon-Captain Thomas David Collis Barry, Indian Medical Service, to be Captain, *vice* English, transferred to the supernumerary list.

NORTH-WESTERN PROVINCES AND OUDH.

Army Medical Staff.—Surgeon-Captain A. E. C. Kohlo is granted leave out of India, for four months, on medical certificate.

Surgeon-Captain A. E. Roberts, M.B., I.M.S. (Bongal), Civil Surgeon, Aligarh, is appointed to officiate as Secretary to the Director-General of the Indian Medical Service, during the absence, on privilege leave, of Surgeon-Major J. T. W. Leslie, or until further orders.

Surgeon-Major T. H. Swoeny to be Civil Surgeon, 1st class, sub. *pro tem.*, from 3rd May 1896 to 31st August 1896, inclusive.

Surgeon-Lieutenant-Colonel W. H. Cadge, Civil Surgeon, Naini Tal, to the medical charge of the camp of His Honor the Lieutenant-Governor and Chief Commissioner, North-Western Provinces and Oudh.

Surgeon-Major A. E. Tate, A.M.S., to the civil medical charge of the Naini Tal district in addition to his military duties.

Second Grade Military Assistant-Surgeon F. G. Fox, whose services have been placed at the disposal of the Government, North-Western Provinces, to be Assistant to Civil Surgeon, Naini Tal, from the forenoon of the 5th December 1896.

First Grade Hospital Assistant Muhammad Yar Khan, attached to the Gunnaur Branch Dispensary, Budaun, hold charge of the Sadar Dispensary, Budaun, from the 25th June to 17th July 1896, both days inclusive.

CENTRAL PROVINCES.

Assistant-Surgeon Bepin Behari Gupta, doing duty under the orders of the Civil Surgeon, Bilaspur, was directed to do duty under the orders of the Civil Surgeon, Hoshangabad.

He made over charge of his duties at Bilaspur on the afternoon of the 14th October 1896, and assumed charge at Hoshangabad on the forenoon of the 21st idem.

Assistant-Surgeon Mudhu Sudan Moitra, doing duty under the orders of the Civil Surgeon, Hoshangabad, was directed to do duty under the orders of the Civil Surgeon, Saugor.

He made over charge of his duties at Hoshangabad on the afternoon of the 18th September 1896, and assumed charge at Saugor on the forenoon of the 19th idem.

Assistant-Surgeon Upendranath Chatterji, attached to the Main Dispensary, Saugor, was granted leave on medical certificate for the period from the 5th September to the 19th October 1896 (both dates inclusive.)

The second portion of this office Departmental Order No. 119, dated the 3rd October 1896, is hereby cancelled.

Third Class Civil Hospital Assistant Kishen Pershad, attached to the Jail Hospital, Sambalpur, is granted one month's leave without pay from the date he may be permitted to avail himself of it.

Third Class Civil Hospital Assistant Suraj Pershad, attached to the Police Hospital, Sambalpur, is appointed to the Jail Hospital, Sambalpur, in addition to his own duties, during the absence of Civil Hospital Assistant Kishen Pershad, on leave.

First Class Civil Hospital Assistant Raghunath Tukaram, attached to the Main Dispensary, Chanda, was appointed to the Police Hospital, Chanda, in addition to his own duties, with effect from the 23rd October to the 19th November 1896, inclusive.

ASSAM.

First Grade Hospital Assistant Pratap Chandra Bose, in subordinate medical charge of the Shillong Dispensary, is appointed to the medical charge of the Chief Commissioner's Staff, in addition to his other duties, with effect from the forenoon of the 3rd December 1896, during the absence, on tour with the Chief Commissioner, of Third Grade Hospital Assistant Kamal Charan Datta or until further orders.

PORT BLAIR.

The services of Surgeon-Major R. N. Campbell, M.B., I.M.S., Officiating Senior Medical Officer, Port Blair, are replaced at the disposal of the Chief Commissioner of Assam, with effect from the date on which he may be relieved of his duties by Surgeon-Lieutenant-Colonel D. P. MacDonald, Senior Medical Officer, Port Blair.

Surgeon-Major R. N. Campbell, M.B., I.M.S., whose services have been replaced at the disposal of the Chief Commissioner, is placed on special duty, with effect from the date on which he reports his arrival at Dhubri.

Acknowledgments.

JOURNALS RECEIVED.

Lancet—British Medical Journal—The Practitioner—Edinburgh Medical Journal—American Journal of Obstetrics—Dublin Journal of Medical Science—Archives of Gynecology and Obstetrics—Manual of Gynecology and Padiatry—Therapeutic Gazette—Provincial Medical Journal—The Journal of the American Medical Association—New York Medical Journal—Medical Record, New York—Besten Medical and Surgical Journal—Times and Register, Philadelphia—Abstract of Sanitary Reports, United States—Occidental Medical Times—Morek's Bulletin of Advanced Medicine and Surgery—Medical and Surgical Reporter—The American Journal of the Medical Sciences—Medical Chronicle—Times and Register—Sanitary Record—Medical Press and Circular—La Tribune Medicalo—La Reforma Medica—Gazette Hebdomadaire—South Russian Medical Gazette—Archives Cliniques de Bordeaux—Gesundheitsrat—Montreal Medical Journal—Dietetic and Hygienic Gazette—Toledo Medical Compend—The Bristol Medical-Chirurgical Journal—Pacific Medical Record—Le Morcredi Medical—Annales de La Policlinique de Lille—United Service Gazette—Indian Medical Record—Indian Medical Reporter—Indo-European Correspondence—Indian Medical Chirurgical Review—O. Archivo Medico da India, Goa.

BOOKS AND PAMPHLETS RECEIVED.

An introduction to Human Physiology. By Augustus D. Waller, M.D., F.R.S.

Triennial Report on the Working of the Charitable Dispensaries under the Government of Bongal. For the years 1893, 1894 and 1895.

COMMUNICATIONS RECEIVED.

Surgn.-Capt. R. H. Elliott, Madras.—Surgn.-Major Walsh, Midnapore.—Surgn.-Liout. King, Jacobabad.—Secretary, Medical Board, Calcutta.—Surgn.-Capt. A. C. Grant, Madras.—Dr. Lawson, Hongkong.—Kenneth McLeod, M.D., LL.D., London.—Surgn.-Capt. Moir, Calcutta.—Dr. Kedar Nath Das, Calcutta.

Original Communications.

EXPERIMENTAL INVESTIGATIONS ON PROTECTIVE INOCULATION OF MEN AGAINST TYPHUS ABDOMINALIS.

BY PROFESSOR R. PFEIFFER AND DR. W. KOLLE.

(From the Institute for Infectious Diseases in Berlin, Prof. R. Koch, Director.)

DURING the last year Haffkine and with him a number of medical officers have inoculated against cholera close on a 100,000 men in India, chiefly amongst the native inhabitants of the country. The material for inoculation is cultivated in agar tubes, from which the growth is emulsified in sterile fluids. Definite portions of the growth collected from one tube are taken as doses, the microbes being either previously killed,* or injected alive. Numerous statistical data and careful observations have been collected some on a large, others on a smaller, scale, referring to the liability to cholera amongst inoculated and non-inoculated individuals, living under the same or comparable conditions of life. The facts observed and registered partly by official English physicians, by Dr. W. J. Simpson in Calcutta, and by others, leave scarcely any room for doubt that the people inoculated according to the Haffkine process become to a high degree proof against natural cholera. A further experimental basis for the explanation of Haffkine's results has been afforded by the observation which one of us has made here on 16 individuals (*vide* Kolle "On the Active Immunisation of Men against Asiatic Cholera," *Centralblatt für Bacteriologie und Parasitenkunde*, Bd. XIX, Nos. 4 and 5). By these observations it was demonstrated that in people who have undergone the inoculation with living or sterilized cholera cultures, the blood shows quite an unexpected specific modification. When a mixture of human serum and cholera microbes is injected into the peritoneal cavity of a guinea-pig, the animal may remain alive; but it requires not less than 0.3 to 0.5 cc. of the serum of a normal man to neutralise the effect of a fatal dose of cholera virus. On the other hand, taking the serum of an inoculated man, it appears that already with a few milligrammes, in exceptional cases even with a fraction of one milligramme—that is to say, with a dose several hundred times smaller—the animal will be protected with certainty against a fatal dose of virus. Similar power has been shown also in the serum of patients convalescent from cholera, as was observed for the first time by Lazarus (*Berliner Klinische Wochenschrift*, 1892, No. 43), and in the serum of animals immunised to a very high degree by gradually increasing doses of sterilised or living cholera vibrios according to R. Pfeiffer's experiments. The specific protection depends on the

formation in the blood of specific bactericidal anti-cholera substances, for the first time discovered and investigated by Pfeiffer (*vide* "A New Fundamental Law of Immunity," *Deutsche Med. Wochenschrift*, 1896, Nos. 7 and 8). On the contrary, neither in cholera convalescents, nor in people inoculated against cholera, nor in animals immunised by Pfeiffer's proceeding, are there to be found any *antitoxic* properties capable of neutralising the specific cholera poison contained in the bodies of the cholera bacilli.

By investigations extending over several years, and of which the chief part is embodied in our work "On the Specific Immunising Reaction of the Typhoid Bacillus" (*Zeitschrift für Hygiene und Infectious Krankheiten*, Bd. XX), we were able to prove that the immunity against typhoid exhibited by men recovering from the disease, and also that produced in animals by artificial treatment, is in its nature very analogous to immunity against Asiatic cholera. In the serum of typhoid convalescents, as well as in animals immunised against the disease, specific bacteriological anti-typhoid substances can be demonstrated analogous to those in cholera, exercising a protective power when injected into the animal organism. Here also one fails to detect in the immunised serum any *antitoxic* properties capable of counteracting the specific typhoid poison contained in the bacterial cell.

As the experiments on the artificial immunisation of men against cholera have given such unexpectedly favourable results, the problem appeared obvious to test the effect on men of small doses of sterilised typhoid bacilli.

We have used for this purpose a culture of typhoid microbes extracted two months previously from the spleen of a typhoid patient, and since then maintained in artificial culture. The authenticity of the bacillus was tested by its specific reaction on the serum of convalescent typhoid patients as well as on that of our goats immunised against the typhoid. The virulence of the culture was very high. Less than $\frac{1}{5}$ of a milligramme of a fresh agar growth (that is, less than $\frac{1}{100}$ of the growth collected in one agar culture) was sufficient to kill with certainty a guinea-pig of 300 grammes by injection into the peritoneal cavity. Another criterion of the virulence of this culture is afforded by the fact that the admixture of 0.3 cc. of normal goat's serum, or of about 0.5 ccm. of normal human serum, was, as a rule, not sufficient to neutralise the effect of an cese (1-20) of an agar culture of 20 hours' incubation.

We selected for inoculation healthy persons, or at least such as were not subject to fever, and who had no history of a previous attack of typhoid. As material for inoculation an emulsion of agar cultures in bouillon was used 1 cc. of our emulsion contained about 2 milligrammes of fresh agar growth. The microbes suspended

* Haffkine's carbolised vaccines.—ED.

in this emulsion were killed by keeping them during several hours in a temperature of 56° c. The completeness of sterilisation was tested by inoculating a few drops of the heated emulsion into fresh bouillon. The emulsion was taken for use only when such inoculated bouillon remained sterile after 24 hours' incubation. 1 cc. of the sterilised emulsion was used as a dose, the liquid being well shaken before use. The skin of the back was selected as seat of inoculation.

The first reactionary symptoms appeared 2 to 3 hours after injection. They were rigor, shivering, feeling of pain at the seat of inoculation. Towards evening the temperature rose up to about 38.5° c. Sleep was somewhat disturbed during the night following the injection. Next morning the temperature was still somewhat above normal, but came down early during the day. After this the other symptoms rapidly disappeared. No infiltration or abscesses were observed.

In every case, *before* the injection, a specimen of blood was taken from the subject to be injected in order to test the protective power of his serum against peritoneal infection of guinea-pigs with the typhoid microbe. The same test was repeated *after* the injection as a rule 11 days later. The method which we applied for the test was the same as described in our paper mentioned above.

The following are the protocols of two of our experiments of this kind:—

TABLE I.

Experiments on Animals.

Serum from Dr. Eisenacher's blood *before* and *after* injection with $\frac{1}{10}$ of an emulsified agar culture killed by heating at 56° c. The serum was tested on guinea-pigs by injecting into the peritoneal cavity a mixture of varying quantities of serum with 1-20th of a typhoid culture—

Weight of guinea-pig in grammes.	Amount of serum used for protecting the animal.	The process in the peritoneal cavity.	Result.	Litre of serum as resulting from the experiment.
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A.—BEFORE INJECTION.

300	0.5 cc.	After 120 minutes fairly numerous bacilli, partly moving about.	Death of guinea-pig.	0.5 cc.
340	0.3 cc.	After 60 minutes numerous bacilli, partly moving about.	Death.	
330	0.1	Ditto ditto ...	Death.	

Weight of guinea-pig in grammes.	Amount of serum used for protecting the animal.	The process in the peritoneal cavity.	Result.	Litre of serum as resulting from the experiment.
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B.—SIX DAYS AFTER THE INJECTION.

300	0.2	After 60 minutes very few, not moving bacilli.	Survival of guinea-pig.	0.5 cc.
300	0.2	Do. Autopsy: Peritoneal exudation contains very few bacilli.	Death.	
350	0.1	After 60 minutes fairly numerous bacilli, moving about.	Death.	

C.—ELEVEN DAYS AFTER THE INJECTION.

350	0.1	After 60 minutes very few bacilli, not moving about.	Survival.	0.075 cc.
360	0.075	Ditto ditto ...	Survival.	
300	0.05	After 60 minutes very few bacilli, not moving. After 100 minutes the number of bacilli is increasing. Autopsy: The exudation contains numerous bacilli.	Death.	
350	0.03		Death.	
360	0.01		Death.	

CONTROL EXPERIMENTS WITH NORMAL HUMAN SERUM.

320	0.5 cc. serum of Mr. Heilsher's blood.	After 60 minutes numerous bacteria, partly moving about.	Death.	0.5 cc.
340	0.4 cc. serum of Mr. Noak's blood.	Autopsy: In the exudation very numerous bacteria.	Death.	0.4 cc.

TABLE II.

Experiments on Animals.

Serum from Mr. Claudewitz's blood *before* and *after* injection with the same material as mentioned in Table I—

Weight of guinea-pig in grammes.	Amount of serum used for protecting the animal.	The process in the peritoneal cavity.	Result.	Litre of serum as resulting from the experiment.
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A.—BEFORE THE INJECTION.

320	0.5 cc.	After 60 minutes few bacilli, not moving.	Survival.	0.5 cc.
360	0.3 cc.	After 60 minutes numerous, partly rapidly moving bacilli.	Death.	
290	0.2 cc.	Autopsy: Exudation contains enormous numbers of bacilli.	Death.	

Weight of guinea-pig in grammes.	Amount of serum used for protecting the animal.	The process in the peritoneal cavity.	Result.	Litre of serum as resulting from the experiment.
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B.—ELEVEN DAYS AFTER INJECTION.

340	0.1	After 60 minutes very few bacilli, not moving.	Survival.	0.01.
350	0.05	After 120 minutes the exudation is almost sterile when examined under the microscope.	Survival.	
300	0.03	After 50, 120, 240 minutes few, not moving bacilli.	Survival.	
360	0.01	After 115 minutes fairly numerous, not moving bacilli.	Survival.	
340	0.005	Effect still marked, though not sufficient to protect the animal.	Death.	

CONTROL EXPERIMENTS WITH NORMAL HUMAN SERUM.

320	0.65 cc. serum of Mr. Noak's blood.	After 60 minutes numerous bacteria, part of which are moving about.	Death.	0.65 cc.
330	0.4 cc. serum of Mr. Lindemann's blood.	Autopsy: The exudation contains numerous bacteria.	Death.	0.4.

TABLE III.

Experiments in Test Tubes.

Effect on the typhoid bacillus of Eisenacher's and Claudewitz's serum *before* and *after* their being inoculated with typhoid microbes. Method: 1/20 of an agar culture emulsified in bouillon is added to given quantities of the serum samples and kept for an hour in the incubator.

SERUM OF DR. EISENACHER.			CLAUDEWITZ'S SERUM.		
Amount of serum tested.	Result.	Lowest amount of serum producing conglomeration of the microbes.	Amount of serum tested.	Result.	Lowest amount of serum producing conglomeration of the microbes.

A.—BEFORE INJECTION.

0.5 cc.	No conglomeration.	0.5 cc.	0.5 cc.	No conglomeration.	0.5 cc.
0.3	Do.		0.3	Do.	
0.1	Do.		0.1	Do.	

SERUM OF DR. EISENACHER.			CLAUDEWITZ'S SERUM.		
Amount of serum tested.	Result.	Lowest amount of serum producing conglomeration of the microbes.	Amount of serum tested.	Result.	Lowest amount of serum producing conglomeration of the microbes.

B.—AFTER INJECTION.

0.1	Distinct conglomeration.	0.02.	0.1	Intense conglomeration.	0.002 to 0.001.
0.05			0.01		
0.02			0.002		
0.01	No conglomeration.		0.001	Conglomeration still noticeable.	

From these experiments it appears that a single injection of a minimal dose of killed typhoid microbes produces in man a specific modification in the blood, which can already be demonstrated six days later, and which reaches at last the same degree of intensity as that which we have demonstrated previously in the blood of typhoid convalescents. From all what we know with regard to the immunity against typhoid, it is more than probable that the appearance of the specific bactericidal substances in the blood of persons recovering from typhoid is the essential cause of the immunity which, as is known, results from an attack of that disease. If this is the case, we must expect that our prophylactic inoculation with killed typhoid microbes may produce an immunity of the same degree and duration as that which is produced by a natural attack. We are the more justified in making this conclusion that the analogous experiments of Haffkine's with inoculation against cholera have stood the test of many thousand times repeated application.

Inoculation against typhoid may, under certain conditions, acquire a practical importance, namely, during the prevalence of the disease in an epidemic form. The operations themselves can be carried out by any medical man without any special preparation. The material to be inoculated can be forwarded to him ready for use. We must mention particularly the importance which these inoculations may acquire in time of war, for the prophylaxis of typhoid during sieges, when, as is shown by the history of wars, whole armies undergo decimation by that disease. We propose to return to this subject in a later communication, and to treat it in a more ample manner.

In conclusion, we cannot fail to mention the numerous experiments on men with typhoid cultures and their products which have been made already previous to us, namely, by Brieger and Wasserman (*Verhandlungen der Gesellschaft*

der *Charité Aertzel*), by E. Fraenkel (*Deutsche Medicinische Wochenschrift*, 1893, No. 41) and by others.* These experiments had, however, another object than ours, namely, they did not deal with the immunisation of the healthy, but with the treatment of the sick. Those experiments led to little satisfactory results as regards the treatment of typhoid patients, the reason of that being that as we know it now exactly, persons already sick, that is, already poisoned by the microbe, behave quite differently with regard to active immunisation than healthy persons. However, these experiments of previous investigators had for us this importance that they showed that the introduction of small quantities of killed typhoid microbes produces quite an insignificant disturbance, as up to now, even when injected into typhoid patients at the height of the fever, no serious consequences have ever been observed.

(Translated from the *Deutsche Medicinische Wochenschrift*, 1896, No. 46.)

EUCAIN IN OPHTHALMIC SURGERY.

By SURGN.-CAPTAIN F. P. MAYNARD

Offg. Civil Surgeon. Ranchi.

EUCAIN hydrochloride is a white, bitter neutral crystalline powder, soluble in ten parts of water on boiling. The salt is not affected by the

* *Note by the Editor.*—We must add to this the following information the inoculations against typhoid on a plan exactly similar to that of the anti-cholera inoculation, had been from the beginning put on the programme as a direct and the first outcome of Haffkine's work in India. The information collected in the years 1894 and 1895 as to the favourable effect of the inoculations against cholera led to the conclusion that a far higher amount of success is likely to result from a similar treatment in typhoid, owing, 1st, to the relatively short period of life during which men are exposed to attacks of that disease, and for which artificial protection is required; 2nd, to the non-recurrence of natural attacks during that period; and 3rd, to the fact that the bacilli of typhoid come in direct contact not only with the intestine, as is the case in cholera, but also with the inner organs, which, under the influence of the prophylactic, are likely to become a powerful means of defence against the disease. At the end of 1895, during M. Haffkine's visit to England, it was decided, with the approval of Sir William Mackinnon, then Director of the Army Medical Department, that the Pathological Laboratory in Netley, under the direction of Professor A. E. Wright, should undertake and carry out the whole plan, and Professor Wright immediately put himself to work. We are informed that the scheme is already far advanced. An important addition has been introduced by Professor Wright in the plan of inoculation, as compared with that in cholera, which makes the vaccinal reaction much less felt than in the case of anti-cholera inoculation, and which may influence greatly the spread of the anti-cholera inoculations themselves. Professor Wright has already inoculated against typhoid a series of persons, chiefly amongst the probationers of the school, on the eve of their leaving for India. It was decided that, after the harmlessness of the operation was demonstrated in this way, it was to be offered to young combatant officers starting for India to undergo the operation before leaving Southampton, and if the offer meets with a ready response, the same will be made with the approval of the authorities to young private soldiers on their way to India. We are glad to see in the work of the eminent representatives of Koch's Institute an expression of such a decided agreement on the subject.

boiling. Its chemical formula is $C_{19}H_{27}NO_4$ HCl. It was introduced by Schering as a new anæsthetic.

It has been tried by various surgeons,—Vinci,¹ Vollert,² Berger,³ DeMets,⁴ and Hirschberg,⁵ for eye operations, and by Gori⁶ in a case of tumour of the bladder, but with contradictory results. These authors do not even agree regarding its solubility; the manufacturer and some surgeons saying it is soluble in water in the proportion of 1 in 10, while Berger states that it is but little soluble in water, and its hydrochlorate (?) only to the extent of six per cent. This has been my experience. Boiling, however, at once causes the hydrochloride to dissolve, and on cooling a 10 per cent. solution gives only a slight re-crystallisation, and a 2 per cent. none at all. These conflicting experiences point to a possible variation in the salt as manufactured.

The authors already quoted all agree that anæsthesia results when eucain is instilled into the eye, that it lasts from eight to thirty minutes and is complete, that smarting pain and lachrymation are more pronounced than with cocaine. They also agree that whereas with cocaine there is conjunctival anæmia, widening of the palpebral cleft and projection forward of the eyeball, with eucain there is marked injection of the conjunctiva, but the eye appears otherwise normal. As regards other effects, however, they differ. Vollert states that the corneal epithelium is destroyed in much larger masses by eucain than by cocaine, and that numerous experiments on animals have proved this. Berger, on the other hand, states that it does not tend to produce the same desquamation of epithelium as cocaine. The latter author again and Vinci say that eucain affects neither pupil nor accommodation, whereas Vollert affirms that mydriasis and decrease in accommodation are both to be observed, "especially when, as during operations, the instillation is plentiful." Manometric observations with eucain have given Vollert, after a temporary increase of 1 to 1.5 mm., a decrease of tension amounting to 3 to 5 mm. as with cocaine. No one has yet found eucain toxic like cocaine.

My own experience with eucain is limited to 20 trials in the following cases and operations:—

Six cataract extractions, 1 pterygium, 2 iridectomies, 2 iridotomies, 3 needlings, 4 massag-

¹ Vinci, and

² Vollert, Münch. Med. Wochenschr., 1896, No. 22 (quoted in (1));

³ Berger, Revue de Therap., June 15th, 1896 (quoted in "B. M. J.," Epitome No. 51, 1896);

⁴ DeMets, Belg. Méd., October 22nd, 1896 (quoted in "B. M. J.," Epitome No. 467, 1896);

⁵ Hirschberg, Centralblatt f. p., Augenheilkunde, No. 8 1896, p. 238;

⁶ Gori, Therap. Monatshefte, July 1896 (quoted in "B. M. J.," Epitome No. 230, 1896).

ings of the cornea, and twice in my own eye. The instillations consisted of three drops of a ten per cent. boiled solution. It will be best to describe the results under the following heads:—

Pain usually lasted $\frac{1}{2}$ to 2 minutes and ceased as suddenly as it began. Burning in 4, severely so in 1, slight in 13, very slight in 1, and none at all in 1.

Lachrymation lasted $\frac{1}{2}$ to 3 minutes; severe in 1, moderate in 7, slight in 8, very slight in 2, and none at all in 2.

Injection of blood vessels came on with the lachrymation and lasted several minutes longer. Involved the deep ciliary zone as well as the conjunctival vessels, the latter losing their injection first; severe in 1, moderate in 13, slight in 2, very slight in 2, none at all in 2.

It was noticed that these three effects—pain, lachrymation and injection—were more marked in fair skinned persons, and less marked, the blacker their skins.

Anæsthesia came on in 1 to $3\frac{1}{2}$ minutes; usually within 1 minute, and becoming complete within 3 minutes. Its duration could not be noted in most of the operation cases, as the eye was bandaged as soon as the operation was finished, and few of these operations lasted as long as five minutes. In no case had the anæsthesia passed off before the operation was completed. In all cases both cornea and conjunctiva were rendered anæsthetic, the cornea first and most completely. No patient whose iris was cut, shrank or gave any sign of pain, as they not infrequently do with cocaine anæsthesia. In two cases (not included here) eucain failed to produce anæsthesia of the conjunctiva, though the cornea became anæsthetic. In them the conjunctiva was much inflamed and somewhat chemosed. Cocain was next tried and failed equally, as it generally does in such cases.

Tension.—In several of the cases the nature of the operation performed prevented any observation of the tension being made, but in the others it was invariably and quickly lowered to —1, and in some instances even more. The diminution lasted some time. In one case of chronic glaucoma the tension was lowered slightly before the operation for iridectomy was begun.

Iris was not affected in any except one case in which the pupil became very slightly dilated half an hour after instillation, and reacted sluggishly to light both directly and consensually. The reaction of the pupil to accommodation remained perfect in all cases where the iris was intact.

Effect upon corneal epithelium was nil, although the tests were severe, and in several cases the cornea was rubbed and subjected to treatment which, with cocain, would have probably resulted in considerable loss of epithelium.

Conclusions.—My experience of the drug has been favourable, and at present I use it in nearly all eye cases requiring an anæsthetic.

Its *drawbacks* are:—(1) pain first and foremost, but varying in degree (apparently with the race of the individual); (2) lachrymation; and (3) injection; (2) and (3) also varying in degree. The injection it produces may prohibit its use in cases where hæmorrhage is to be feared. Its *advantages* are:—(1) the anæsthesia is quick, complete and sufficiently lasting for ordinary operations even after one instillation (and of course more can be used); (2) the tension is diminished. Whether this is of any lasting effect in glaucoma requires more than my brief experience of it to say; (3) there is no effect on either pupil or accommodation; (4) no damage to corneal epithelium follows its use; (5) its solution can be sterilised by boiling as often as necessary; (6) it is not toxic like cocain; (7) last, but not perhaps least, is the cheapness of eucain compared with cocain; their present prices in Calcutta are Rs. 2 and Rs. 3-8 a drachm.

Since writing the above I have employed a 2 per cent. aqueous solution, but find that in my own eye it produces as much smarting pain as the 10 per cent. solution, while the anæsthesia is less complete and less lasting. In other cases I find several instillations of a 2 per cent. solution act as well as one of a 10 per cent., but of course it takes longer to produce complete anæsthesia.

DeMets found a mixture of 3 parts eucain to 1 part cocain, of whatever strength, very useful. I have not yet tried this.

THE EPIDEMIC OF BUBONIC PLAGUE IN HONGKONG, 1894.

By JAMES A. LOWSON, M.B.,

Medical Officer in charge of Epidemic Hospital.

(Continued from page 17.)

Among Chinese the voice in almost every case—even where the patient was sensible—was very weak; it was not so as a rule with the Europeans whose lung power and larynges were always in a much better state than those of the natives. Laryngitis when occurring was generally the result of extension of cervical glandular inflammation, and at the end of the epidemic, when these glandular inflammations were of an extremely mild character, laryngeal mischief was not met with at all.

Affections of the *urinary system* were practically limited to a slight and transient albuminuria. This was always slight, a trace to 1/20th being the common report on the charts. A larger amount I never saw. Hæmaturia was not noticed amongst our cases. Retention of urine was frequent and, notwithstanding every attention to cleanliness, cystitis developed on several occasions where frequent catheterisation was necessary. Unconscious urination at the beginning of the epidemic was also frequent, generally coincident with incontinence of fæces if the bowels were at

all loose. Urine was generally dark coloured and of high specific gravity, with increased secretion of urea. I noticed no casts in the urine. Sometimes the apparent incontinence in the Chinese hospitals was due to distention of the bladder.

SKIN.

With two exceptions (urticaria and a herpetic eruption) which were only coincidental no rash was noticed (but *vide* Case XXII). The skin was dry and pungently hot, except in collapsed cases when it was cold and clammy. After the acute stage of the disease perspiration in most cases was marked. The question of the occurrences of hæmorrhages should be considered in conjunction with the *post-mortem* appearances of organs where hæmorrhages have occurred. At the beginning of the epidemic almost all the Chinese showed small red spots about the size of a pea. When I was in Canton and enquiring about these spots a Chinese coolie volunteered the information that they were the result of insect bites, generally mosquitoes and flies. I think I am giving a guarded opinion when I say that 95% of these spots seen during the epidemic were caused by mosquitoes or flies. The condition of the blood was such that the slightest scratch or injury was generally followed by a dull pink blush appearing round it. On incision it was found to be composed of a small extravasation of thin light coloured fluid blood. All the hospitals except the *Hygeia* were swarming with insect life which we could not get rid of, although thousands were slaughtered daily by fly-papers and other contrivances. In almost every case the spots appeared on the exposed parts, ankles and feet, wrists and hands and face. On the *Hygeia* patients received at the commencement of their illness scarcely ever had a single spot, and there were no mosquitoes on board and few flies. A puncture with a pin or a trivial blow or excoriation was often followed by the characteristic discoloration a few days later. The Chinese method of pinching (as a counter irritant) caused wonderful appearances on the chest and neck, the whole of this region of the body being sometimes of a colour varying from dull pink to dark violet. Mosquitoes, flies, etc., are very numerous all over Hongkong, and the dead bodies which were picked up in the street showed the same spots. I never saw one of these spots above the size of a five-cent piece (the same size as a blister caused by a mosquito bite). In Kennedytown Hospital, where patients had their *pyjamas* properly fastened, these spots were almost invariably confined to the exposed parts of the body. I never saw a hæmorrhage in the skin anything like those seen in purpura, which are darker in colour, at least in the centre. All these plague marks were small and dull pink in colour. One day they appeared atypical mosquito bites, the following day they looked like hæmorrhagic spots.

The word "Carbuncle" should be expunged from plague literature as I take it that "Carbuncle" when used in this connexion is meant for a hæmorrhagic blister, or a bubo in the neck, several of which looked like carbuncles, but were really glandular in character. These were seen in only a few cases (four I think of the early cases). A true carbuncle was never seen. Boils were several times met with during convalescences as a result of the debility caused by the disease, and differed from the ordinary tropical boils common in Hongkong in that the pus was thinner and that there was no true core or slough, whilst an inflammatory areola of redness was seldom present,—in fact they ought to be called multiple abscesses rather than boils. In one case true boils occurred early. In one bad case of multiple abscesses, necrosis of several parts of the skull took place.

Hæmoptysis was very rare, only two cases (on the *Hygeia* and at Kennedytown Hospital) being serious. Hæmatemesis and melæna were equally rare.

Bleeding from nasal or buccal mucous membrane was noticed several times early in the epidemic. Hæmaturia was never noticed. Hæmorrhage into the conjunctivæ was noticed in a few cases. Two cases of hypopyon came under observation.

In speaking of hæmorrhages into the conjunctivæ as being occasionally seen it must be noted that congestion of the conjunctivæ was very general at the onset of the acute cerebral symptoms.

Every pregnant woman brought to hospital aborted. All died with one exception. Contrary to what one might have expected none died from uterine hæmorrhage, but evidently from the virulence of the disease. In the cases I saw the uterus had contracted well. Hæmorrhage from the genital canal was noticed in a few instances, notably in the case where hæmorrhagic endometritis was found *post-mortem*.

The following list gives the numbers of those who had apparent hæmorrhages in the Government Hospitals. It is possible that one or two more should be on the list, as our Wardmasters could not be expected to note it in cases where the patient came in through the night and died before the doctor's first visit in the morning. Out of about 450 cases there was hæmatemesis in 7; melæna, 4; hæmoptysis, 4; epistaxis, 2; hæmorrhage from gums, 1; hæmorrhage from vagina, 2; hæmorrhagic blebs, 3; hæmorrhagic into conjunctivæ, 2. Of these 23 cases 18 occurred in May, so that it is evident that hæmorrhages were most liable to occur when the disease was most virulent in its epidemic form.

The course of the buboes after formation was one of four: (1) early resolution; (2) lengthened period of enlargement; (3) suppuration; (4) sloughing.

Early resolution may take place, though it was only seen in some mild cases where the glandular enlargement was slight. Lengthened periods of enlargement occurred in several patients in the Slaughter House Hospital (under native doctors), where the swelling did not go down even after two months in hospital. An indurated mass sometimes remained on which iodine, mercury, and other usual remedies had very slight effect. One of our patients (who was afterwards retained as an attendant), had a glandular mass remaining at the end of four months with practically no change in size or consistence. If the patient survived, suppuration was the most frequent termination during the first two months of the epidemic, either alone or combined with sloughing. If the glandular mass was very large there was generally a slough, caused by the surrounding inflammation and suppuration, which was vividly described by a Chinese nurse as a "mixture of boiled cheese and thread." If the bubo was small it generally terminated in simple suppuration without the separation of any decided slough. Sometimes great necrosis of skin and superficial tissues occurred over the buboes, and the proximity of femoral buboes to the femoral vessels had a tendency to make one over-cautious with the knife. In the case of Allen the bubo took six months to heal up, the glands along the iliac vessels having evidently been enlarged, and giving the greatest trouble after suppuration.

Lymphatic abscesses may develop along the line of the lymphatic vessels. This was especially marked in the case of Aoyama.

For a long time after the acute phase of the disease was over the tissues remain in a very low condition, incisions taking a long time to heal, there being often no appearance of the epidermis growing over an ulcer for weeks. The granulations remained flabby and unhealthy, and there was a well marked line between the granulations and the skin, with no attempt at growth of epidermis over the ulceration.

The presence of bacilli in the blood being a most important symptom I make no excuse for describing it fully, so far as it is necessary for diagnostic purposes. Examination is very easy when one has observed an expert at work, but it is only by attending to every little detail that easy and satisfactory examination can be carried out. Take care to have good clean cover-glasses and slides (we were bothered here very much by having on hand cover-glasses which had become hazy from climatic influences). Cleanse the finger tip with alcohol; allow the alcohol to evaporate; constrict the finger with small strip of lint; puncture the finger with a pen-nib from which half of the nib has been broken off and which has been sterilised in the flame of a spirit lamp. With a sterilised platinum point smear a very little blood in a fine layer on the clean cover-glass. Four or six cover-glasses are

generally prepared as the bacillus may not be discovered in a solitary preparation. The moment the cover-glass is dry, pass it three times through the flame of a spirit lamp with the blood-side away from the wick. See that the flame is a spirit flame and not merely a burning dry wick. Do not wait hours before passing the cover slip through the flame, as then the specimen will generally be found useless. After passing through the flame the staining and examination can take place practically at leisure.

Dr. Kitasato found fuchsin the best stain for the bacillus, while Dr. Yersin used gentian violet. It is all a matter of taste I believe and what one is most accustomed to. Personally I find examination may be prolonged with more comfort to the eye if gentian violet be used or even methyl blue. Fuchsin is the best stain if only a few preparations want examination. The staining fluids ought not to be too concentrated: Place a few drops of the stain on to the cover-glass preparation. This is better than floating it in a watch glass, being easier and wasting less stain (a matter of consideration in Hongkong). If of methyl blue, at once turn on to a slide, compress the preparation between a couple of layers of blotting paper without "fluff" on it, and the specimen is ready for examination. If fuchsin or gentian violet be used a period of from three to five minutes should be allowed for staining (according to the depth of the colour of the solution) and then the cover-glass should be washed with distilled water and placed on the slide and dried in the same way as above with blotting paper. If the specimen is to be kept, the water should be slowly evaporated *above* the flame of the spirit lamp, and mounted in Canada Balsam which has been heated for a few seconds after being on the slide. Then examine with a 1/12th inch oil immersion. The bacilli are often few and far between, but it is of the utmost importance that a careful examination be made in cases where no glandular swelling can be felt, and where the diagnosis is doubtful. During the latter part of the epidemic about 80% of the cases where diagnosed by the microscope alone, involving many hours' labour a day on what to most people is not interesting work. Once the bacillus is found the case is one of plague. Should the bacillus, on the other hand, be absent, it does not necessarily follow that it is not plague. On one or two occasions we had to wait for the *post-mortem* examination to give us the cause of death. I put a hypodermic needle into the spleen (where the bacilli are generally abundant) in order to verify the diagnosis of one case. If a case is diagnosed plague then this examination completes the chain of evidence. In the case of a bubo which may or may not be a plague one it is advisable to take the blood direct from the gland, by a hypodermic needle or through a small incision with a tenotomy knife. These details are well known

to bacteriologists, but unfortunately every one is not a bacteriologist.

For diagnostic purposes it is sometimes necessary to get a culture on agar-gelatine or blood serum. This has to be done in the most careful manner as far as precautions are concerned, in order to get a satisfactory result, for it is to be remembered that in out-of-the-way places where plague may develop it is not always easy to obtain agar-gelatine or blood serum, and even if obtained it is a tedious process to get them properly sterilised. Other points on the bacillus will be touched upon later; what has been written is enough for symptomatic or diagnostic purposes.

DIFFERENTIAL DIAGNOSIS.

When diagnosis has been reduced to a question of microscopic examination there cannot be much to be said upon the subject. The only difficulties we had in determining cases previous to Dr. Kitasato's discovery, were with bad malarial fever cases, lymphangitis with irritative bubo of leg; one or two inflamed glands of the neck, and enteric fever. As regards intermission of temperature I cannot bear out Cabiadis' statement that no intermission occurs in plague. Intermissions do occur.

A case of mistaken diagnosis No. XII is given which was diagnosed by us as not plague owing to the absence of head symptoms, and on account of other reasons which are given. Another case of mistaken diagnosis is given which, even before microscopic examination was made, we pronounced to be not plague, because of the absence of a symptomatic tongue, head symptoms, and the pulse usually met with in plague, and on account of the presence of another cause for the illness.

The question as to whether there has or has not been exposure to infection should weigh little or nothing at all during an epidemic of plague, for there are many roundabout methods of infection.

One serious difficulty we had in determining the cause of death in dead bodies required for burial purposes, more especially towards the end of the epidemic. The mortuaries situated in different part of the Colony had to be examined regularly every day, but as the very idea of *post-mortem* examination had to be kept in the background, the difficulty of being able to tell fairly accurately whether a person had died of plague at once becomes apparent. If the Chinese had been allowed to remove their bodies as they wished to do, it might have been expected that plague would break out in outlying places. It is to be remembered that in *Hong-kong* the Chinese are allowed to exhume the dead after an interval of seven years; there was therefore all the more reason for getting every plague corpse buried in a special cemetery where exhumation was not to be allowed.

Swollen glands where the first thing to look for, then sordes in the mouth, then the special appearance of the tongue. Often the bodies bore the typical "facies" of the disease after death. The occurrence of the pink blush round mosquito bites, with any hæmorrhages apparent, also helped to determine where the corpse should be interred. Microscopic examination of blood removed from the spleen will probably be the method of diagnosis in these cases in future. Typhoid fever is a disease possible to be mistaken for plague—*vide* Case XVI.

PROGNOSIS.

There is no one special sign that gives hope for recovery, whilst there are many that are decidedly bad, and which are valued according to the ordinary ideas of medicine. Buboes do not suppurate as a rule until the primary fever has fallen, by which time you know that the patient is better.

To imagine that suppuration is a good sign is to put the cart before the horse, the suppuration coming after the recovery from the acute stage of the disease.

I liked to see a patient with three or four copious loose motions per diem not amounting to diarrhoea. As a rule this was often the patient who was not troubled with vomiting, and whose brain symptoms were not so severe.

In this as in other diseases a good heart, physically and morally, is the best thing a patient can possess.

TREATMENT.

Hospital Prophylaxis.—At the beginning of the epidemic every precaution that we could think of was taken to prevent the infection of attendants. Most of these precautions were useful and necessary, whilst others proved to be more in the nature of luxuries. As our knowledge and experience of the disease progressed we were able to bring down our requirements to fine lines. Plenty of fresh air was a *sine qua non*, both for patients and attendants. At first attendants were allowed to smoke as they pleased, and as a couple of rabbits died in two days after inoculation by blood from our first case, nurses had strict orders to be careful of all wounds or scratches on their fingers, and to see that they were dressed with some antiseptic at once. They were ordered to use eucalyptus oil or carbolic acid solution on their handkerchiefs more especially when the hospitals were crowded, but when a more plentiful supply of fresh air was forthcoming this was left off. Faces were disinfected by quicklime or carbolic acid as were all dressings. At the Slaughter House Hospital Jeyes' fluid was used as the disinfectant all along. If at any time the wards smelt badly from any cause or the stillness and closeness of the atmosphere became oppressive, some eucalyptus oil evaporated over small lamps had a wonderful effect in alleviating the nauseated feeling that

sometimes came over the attendants. In the beginning nausea was sometimes brought on by the cigars or pipes which were freely used, but as we gained experience this was all remedied.

All patients' clothes, being practically worthless, were burned on admission. Patients were given a hot-bath, if in a condition to stand it; or were sponged down on the bed. Chinese who were not wildly delirious were placed on the ordinary Chinese bed and mat; but if likely to do themselves harm they were put on a mattress. Mattresses, pillows and mats were burned after being in use some time, the length of time in use depending on the amount of soiling. If we had had a more ample supply of mackintosh sheeting, a large one would have been put on each bed, as being by far the best way of keeping beds in a sanitary condition. One thing to be beware of is not to give purgative medicine to all new patients at the same time. Often when a number of patients had calomel after the evening rounds, the nurses had rather a hard time of it the following morning, which delayed the routine work of the hospitals too much. Carbolic acid and permanganate of potash were of necessity freely used in the wards; blankets and sheets being frequently washed in a solution of the former. With the accommodation at our disposal attendants, when unemployed, were kept as far away from the hospital as possible, and plenty of soap and carbolic acid was supplied to them.

Any attendant, complaining of headache, languor, sore-throat or fever was immediately relieved from duty. Only healthy people should be allowed to approach plague cases.

Prophylactic measures should consist in remedying the causes that predispose to the disease. During an epidemic, personal cleanliness should be carefully observed by those who have any work to do which takes them near the infected district. In addition to the usual daily tub a bath should be taken immediately after coming out of the affected area, some disinfectant like Jeyes' fluid being used in the water. A change of clothes is essential, and those that are discarded should be removed immediately, and exposed to the fresh air. If it is no trouble they may be put through the steam steriliser, but it will be found that free exposure to air in the sunlight will be sufficient. With regard to those who are employed on cleaning or disinfecting houses, the following precautions should be observed. Free smoking should be allowed. The workers should be warned about scratches or wounds on their bodies; and a medical inspection of them should be made every day; those with wounds not being permitted to do the dirty part of the work. Preferable to smoking would be the use of respirators with exit and entrance valves; and a sprinkling of thymol or menthol over the entrance valves. Professor Kitasato suggested oil of peppermint.

If smoking goes on, then a carbolic mouth-wash should also be insisted on. As regards stimulants these should be dispensed carefully but not too freely, the nauseating character of the work in a dirty town sometimes suggesting a too occasional glass of whisky or other alcoholic stimulant. Before cleaning out-houses, the furniture, &c., should be well washed with carbolic solution, by means of a hand hydrant, and cleaning should proceed whilst the furniture, &c., is wet. After removal another good wash with carbolic or quicklime should take place. Chlorine will prove an efficient disinfectant if used in good quantity within a building, the doors and windows being carefully closed. Dirt and rubbish removed should be *at once* burned. The removal of the healthy from infected houses should be insisted on. They should be transferred at once to some outside encampment. When it is realized that the floating population of Hongkong practically escaped scot-free it is a matter for regret that a suggestion made by Surgeon-Major James and myself (on May 31st) to form water camps for the inhabitants of Taipingshan was not acted upon. "To keep the people in Taipingshan separate from those in the as yet unaffected districts, we recommend very strongly as a suggestion that a water camp be formed separate from those on the land proposed for the unaffected districts (whilst a thorough scavenging of the other parts of the town was going on). Things look so serious that these measures appear to us to be absolutely necessary to prevent a rapid increase of the disease throughout the city and in Taipingshan *especially*, and we beg your most serious consideration "of our proposals." In spite of the remarks made by the special correspondent of the *British Medical Journal* in its issue of 1st September (Dr. James Cantlie), I am convinced that an epidemic of plague in Hongkong could be tackled and got under rapidly if men in sufficient number could be got to do the work. Isolated people should be medically inspected every day, and fresh cases would soon cease to occur if the camps were looked after in a proper manner.

As regards *treatment* of the sick, a certain routine of treatment was carried out in most cases. Towards the end of the epidemic a true "survival of the fittest" of the medicines at our disposal occurred.

A ten-grain dose of calomel throughout the epidemic was the usual purgative to commence with; compound jalab powder grains xl was added sometimes, but as a rule the calomel proved efficient, a Sedlitz powder six or eight hours afterwards being occasionally indicated. We began feeding with the most easily assimilable nutrient food that could be got; egg-flip and strong beef tea being the most easily procured and the cheapest formed the most considerable part of the Chinese diet during the acute stage. Brand's essence and other patent preparations were also

given, but did not give so good a return for the money expended; they are expensive without being any improvement upon the egg-flip and strong beef tea. Moreover, the Brand's essence is generally disliked by the Chinese. Brandy is not so much disliked. Within ordinary limits any nourishment that a plague patient fancied he had, and we were glad to see him take as much as possible during the first two days of illness before he became delirious, as afterwards the difficulty of getting him to take anything at all was very great. So long as the pulse was good we did not stimulate, but began when dicrotism was evident. Ammonia and cinchona we generally started with (half a drachm each of sp. ammon. co. & tinct. cinchon. co. with an ounce of chloroform water being given as a rule every four hours). Digitalis generally required to be added early. Sometimes the infusion was used, sometimes the tincture. Different mixtures were kept in stock, and according to the patient's condition either ammonia and cinchona were given alone, or with varying doses of digitalis or with strophanthus added. Strychnia was also given, prescribed alone, as the carbonate of ammonia precipitates the alkaloid if used with the mixture. One would have expected that digitalis would markedly improve the pulse if the dilatation of vessels were solely due to vasomotor nervous conditions, but it did not. From experience I found strophanthus better, as it never caused the pulse to get worse as digitalis sometimes undoubtedly did. Far better than either, however, is strychnia which we began to use liberally towards the end of the epidemic, and I think that in future cases the routine use of strychnia should be begun early. The dose, of course, varied with the case, but from 5-10 m. of the liquor strychniæ by stomach every four hours did not seem at all too large a dose, and I should be inclined to give considerably larger doses than this sometimes. Digitalis in theoretical medicine ought to be the best of the drugs abovenamed, but undoubtedly strychnia impressed me as the better drug for the vascular condition. Although it would be scarcely fair to blame digitalis for making all intermittent pulses worse, when intermittency was already evident, yet it certainly did so sometimes. Liq. ammon. fort. applied to the nostrils was of great use sometimes in the heart failures which often took place, whilst hypodermic injections of ether at this stage were occasionally a necessity. Whilst the majority of heart failure cases proved rapidly fatal, yet in some cases where treatment was energetic it was wonderful to see how some practically moribund sufferers would rally and sometimes get better. We did not despair even when the pulse could not be felt. Vomiting was often one of the first symptoms that required treatment, and this was usually stopped by an efficient mustard plaster on the epigastrium. Vomiting and diarrhoea rarely went

together, and the best treatment for the former was to procure satisfactory purgation by calomel. I can only remember one or two cases where vomiting was persistent and obstinate after this treatment. If the above means were not sufficient, ice to suck and some hydrocyanic acid and liq. morphinæ in an effervescing mixture, given occasionally, generally sufficed to check it. A mustard plaster was also a most efficient application to the epigastrium.

In mild cases small doses of quinine gr. iii thrice a day were sometimes sufficient with adequate nourishment. Before speaking further of treatment the following axiom must be enunciated—*never use depressants if you can possibly do without them.* The great tendency to cardiac failure has often been noticed in bubonic plague, but I do not suppose its more frequent occurrence due to the introduction of Western medicine has been noted. I must confess that many cases were not benefited by some of the drugs used—drugs which are so often given with impunity in other serious diseases—and in making this statement I am criticising my own as well as my colleagues' treatment. The reason why we did not find out this almost at the beginning of the outbreak was that we had no time to watch the immediate effect of our treatment as there was so much to do, and in many cases which we had marked to watch carefully the patient had succumbed before the next visit was paid.

It has to be borne in mind that we had great difficulties to contend with as regards exact and proper clinical observation at the outbreak of the visitation, there being so many duties to perform—apart from hospital work—that our medical staff was quite unequal to the strain thrown upon it.

Reduction of temperature was always attempted by tepid sponging, and even then ice had to be freely used as the temperature of the water we had to use was always over 75° F. and generally over 80° F. Patients with a temperature of 104° F. and over were sponged every hour through the day or as nearly every hour as circumstances would permit. All patients with a high temperature were benefited by cold applied externally, and this sponging was always the best antipyretic. Antipyrin in large doses was frequently followed by disastrous results, and towards the end of the epidemic grs. v. of phenacetin were given when the pulse was fairly good, phenacetin evidently being less depressing than antipyrin. Not only this but even by the use of large doses of antipyrin or phenacetin temperature was only very occasionally reduced by more than 2° F., a result not commensurate with the danger run. Brandy and tepid sponging were without doubt the best antipyretics. Aconite and antimony were tried once or twice to commence with; the idea being that by keeping the circulation quiet for 24-48 hours and then stimulating, the patient might have a better chance of pulling through. This treatment was a failure.

The question of procuring sleep was an important one, and here morphia was our sheet anchor all through the epidemic. Notwithstanding the fact that in plague we have almost all the contraindications for the use of morphia, yet it was far and away the most serviceable drug. In the early stages of the disease it was often given freely; and in the later stages, used in much smaller doses, it was of equal benefit. Granting its apparent danger, it proved in result much more satisfactory than any other hypnotic used. From one-eighth to one-half a grain at night was given as a rule with safety at the commencement of sickness, while in later stages gr. $\frac{1}{2}$, repeated if required, was the general dose. Notwithstanding all this, I admit that it is necessary to carefully judge what cases to give it in, and when to give it; and to remember that grave issues must be faced in giving it.

Hyoscinin doses of from 1/200 gr.—1/75 gr. was the next best hypnotic we used. In some cases it acted in a marvellous way, in others it was apparently without effect. Chloral and bromide of potash in combination (the usual doses of grs. xx and grs. xxx respectively) was in many instances quite sufficient, but here the cases were as a rule mild. The ice-bag should be in continuous use. Case I—our hospital "boy"—was conscious at intervals almost to the last, and the only thing he resented was the removal of the ice-bags when they had to be refilled. The ice-bags should be large and one should be placed on the forehead, and the other at the nape of the neck.

Blistering of the nape of the neck and lower occipital region was sometimes beneficial. We found the best way to do this was to use the emplastrum lyttæ as Dr. Horder suggested, viz., by repeated but short applications just to prevent vesication. Of Leiter's tubes we had none, and the imitations we got made by Chinese workmen were not a success consequently they were not tried.

Thirst in European patients was more marked than in the Chinese, and the soldiers attacked seemed to thrive on beer and stout which had been well iced. This was what they preferred to have, and I must say it did excellently well, being at once stimulant, soporific, nutritious, and thirst quenching. Ice-cream made with pure cream was also greatly relished by the European patients.

As regards diarrhoea the best results were got from salol grs. x every 4 hours. Naphthol and other similar drugs would probably have been equally good, but were not so easily procurable. In another epidemic some of these so-called intestinal antiseptics should be freely used, as they do no harm as a rule, and the possibility of diminishing the virulency of the fæces by their means should not be overlooked. Mist. astring. c. opio was of little avail. Enemata of starch and opium were not of much use either, being seldom retained for more than a minute. If straining

was troublesome a suppository of morphia gr. $\frac{1}{4}$ and cocaine gr. $\frac{1}{2}$ as a rule brought about comparative comfort after two or three introductions. The treatment of the bubo resolved itself into simple methods. Glycerine and belladonna at the beginning of the epidemic was the most useful applications, on account of the painful character of the swelling; whilst later, when suppuration did not take place so often, iodine proved the more useful application. In the earlier period of the epidemic this drug would have had no more effect than ditch-water. Whenever redness appeared we poulticed at once and opened; whenever pus was diagnosed, we opened freely and drained; iodoform being the best application, the bacilli in the swelling disappearing from the discharge in a few days. It was very necessary to ensure good drainage, as if imperfect, burrowing was almost sure to be very troublesome. Bladder trouble, retention, cystitis, &c., had to be met by catheterization, diluent drinks, strychnia,—in fact ordinary treatment; lung trouble by ordinary medical measures; the addition of a little senega to the ammonia, cinchona and digitalis being as a rule quite sufficient to bring about improvement. Pneumonia was treated *secundum artem* as it arose—and we soon learnt to keep a sharp look-out for it especially after the first fever.

Camphor was given to Professor Aoyama (as it was one of his favourite drugs) as a cardiac stimulant. It could not do harm, but we took good care to let him have plenty of ammonia, brandy, digitalis, &c., as well.

Aoyama himself, before his attack, had suggested in the wards that digitalis folia would probably be the most satisfactory method of exhibiting this drug; his suggestion was applied in his own case, but without any specially marked good effect.

When it is borne in mind that the loss of hæmoglobin was noted as an important symptom from the very beginning of the outbreak, the possibility of the transfusion of healthy blood naturally suggested itself as likely to be at least a small help in treatment. Some experimenters maintain that it is no use, or rather that salt and water is as good. I doubt it. Not only would the amount of hæmoglobin be increased, but fresh and healthy leucocytes would be introduced into the patient's system, and there is no knowing what assistance this might not be to the fighting line of the person attacked. When Captain Vesey was so ill, we had numerous volunteers from his regiment to give blood if the course of the case proved suitable for the operation, but as in his case the hæmoglobin did not fall below 40% and his lung and brain symptoms were so acute, the occasion did not occur. In one case where a Chinaman had been lying in a collapsed condition for almost two days we transfused him with a hot saline solution with the result that his circulation improved for some

hours, but he again sank into his former state of collapse and died. The fluid was injected at a temperature of 110° F. in the funnel, and had a distinctly beneficial effect on his general condition, but it was only temporary as we expected it would be.

A supply of oxygen for inhalation was kept ready for all the European and Japanese patients. When administered it always improved the pulse and respiration for a short time. It was only used in the worst cases; the trouble of preparation and administration, and the want of time preventing an extended experience of it being gained.

Injection of iodide of mercury into the bubo was tried at the Alice Memorial Branch Hospital but I do not think with success. We tried carbolic acid in a few cases, but it was useless. I do not think that these injections can ever be of the slightest good after the disease has developed, as the greater part of the solution cannot be absorbed, and the amount necessary to counteract the poison would simply assist in killing the patient.

Nitrite of amyl and nitro-glycerine were suggested by some enthusiasts as suitable drugs to be used in heart failure in the later stages. They were never tried as in my opinion they would only have made the vascular condition worse.

MORBID ANATOMY.

On opening the abdomen in only a few cases could the spleen be seen coming below the ribs. It was, however, always somewhat enlarged and hyperæmic. In consistence it was softer than normal but not different as is sometimes met with in malignant malarial cases. The malpighian bodies were always swollen and well marked. There were occasionally small punctate subcapsular hæmorrhages, these were never large on the surface of the spleen. In one or two *post-mortems* considerably enlarged spleens were met with, but in my opinion the enlargements were principally due to malarial causes, and this seemed to be borne out by the greatly thickened and fibrous capsules. This would not be likely to happen in the course of a week's illness. Towards the end of the epidemic very few hæmorrhages were found on the surface of the spleen, or in fact anywhere.

The liver as a rule showed no marked enlargement. It was generally soft and more friable than normal. Occasionally small hæmorrhages were seen on the upper surface—punctate in character. It was generally somewhat paler than usual, but in two cases the substance was deeply bile-stained. The gall bladder was almost always full of dark brown tarry bile—on very few occasions of *post-mortem* was it found really distended. The kidneys were usually congested, with occasional small subcapsular hæmorrhages; none were seen in the substance of the kidney.

In the mesentery very large hæmorrhages were sometimes met with, and these seemed to be largest in cases where the glandular affection partook of a large hæmorrhagic character. Hæmorrhage on the serous coat of the stomach was not seen. On the mucous surface they were occasionally seen, and here again they were always punctate in character. The small intestine was occasionally inflamed somewhat, and here on several occasions Peyer's patches were distinctly affected, rising slightly above the surrounding surface, and presenting a retiform appearance. On a few occasions some of the solitary glands in the large intestine showed a similar inflammation. The mesenteric glands were *almost always* enlarged; sometimes slightly, generally markedly, and occasionally considerably. When small they were of a dark blue or purple colour with no hæmorrhage into or around them. As the size of the gland enlarged there seemed to be a greater tendency to a sero-sanguineous effusion around, as in the case of the externally apparent buboes. Hæmorrhage into the ovary (considerable) was met with once, and also a hæmorrhagic endometritis.

The lungs were generally somewhat congested and dark at their bases, and occasionally some fluid was found in the pleuræ; but this was never seen in quantity say of a pint. Pneumonia was present in a few cases. Hæmorrhages were rare on the visceral pleura; on the parietal pleura they were not seen at all. In two or three cases of persons who died late (*i.e.*, after the tenth day) in the disease multiple abscesses were found, pyæmic in character. The bronchial glands were often enlarged although rarely to a great degree. I never saw any of the bronchial glands exhibit the hæmorrhagic type sometimes found in the mesentery. The larynx was sometimes congested and inflamed, but this was co-existent usually with large cervical glandular enlargement, though by no means invariably so.

In some of the early cases we found the *left* side of the heart *firmly contracted*, with the right side dilated. In almost every case examined, the right side of the heart was dilated, but in some of these cases we were rather surprised to find the left contracted—it was, perhaps, to be expected that it might be empty or almost so, but not in the firm condition in which we found it. To my mind this calls for thoughtful consideration, and I regret that a reasonable explanation does not suggest itself to me at present. On a few occasions a small amount (a few ounces) of pericardial fluid was present. The substance of the heart in those who had been ill for several days was generally softer and paler than usual—inflammation going on to fatty degeneration. Under the visceral pericardium on several occasions punctate hæmorrhages were seen—none upon the endocardium. No fresh

endocarditis or pericarditis was seen. Antemortem clots were frequently found, especially on the right side; these were generally small, however, and did not fill up the cavities, a large quantity of fluid dark watery blood being also present, whilst the venæ cavæ were generally distended by the same fluid.

The thyroid gland was never enlarged except when evidently due to direct extension of the inflammatory mischief in the neck. The thymus in a child was in one case the seat of a large abscess co-existent with pyæmic abscesses of the lungs.

On opening the skull the meninges were invariably found to be hyperæmic, as was frequently the brain matter. In a few cases there was an increase of cerebro-spinal fluid, but this was seldom marked. Both the dural and pial membranes were generally bright red all over the brain, and occasionally the grey matter underneath was rosy red, showing a condition of acute cerebritis. The longitudinal and lateral sinuses were generally full of the dark fluid watery blood. At the base the congestion of membranes, and even the pons and medulla themselves, was most marked. Hæmorrhages were rare in the substance of the brain itself only on three occasions did I see a hæmorrhage, in the pons varolii, others had been diagnosed during life but not found *post-mortem*.

As regards the glands which are affected one met possibly with only one markedly enlarged, or many lymphatic glands in the body enlarged either slightly or to a very great extent. In the early cases, as I have already mentioned, the enlargement in one special region seemed to swamp the interest taken in the rest of the glandular system. The enlarged glands principally affected were generally surrounded by a sero-sanguineous exudation, in the midst of which a hæmorrhagic gland or glands was situated. Only in two or three instances was pus actually met with in these on the *post-mortem* table. The peri-glandular effusion was in a few cases very great round a small gland, and sometimes the œdema would extend round this further still; whilst often a chain of glands would be greatly enlarged without any surrounding exudation at all. As the epidemic went on the extravasated fluid became gradually less, and at the end of the epidemic it was seldom seen, the slightly enlarged gland or glands being generally clearly seen as a dark blue body distinctly outlined in the surrounding fatty or subcutaneous tissues (referring to the femoral glands which were generally first cut down on).

Sometimes a very great amount of œdema was present in the neighbourhood of the bubo.

MORTALITY.

Taking the total number of deaths and recoveries amongst the Chinese (as far as official figures go) the death-rate was 93·4%. Amongst

Indians it was 77 %; Japanese, 60 %; Eurasians, 100 %; Europeans, 18·2 %.

I have no doubt that one cause of the heavy mortality amongst Chinese was the want of efficient medical attention and nursing in the early days of their illness. Many died in their houses without the slightest attendance. The Chinese admitted to European hospitals only came in after having been several days sick, when the most favourable opportunity for treatment had passed. The cases which lived longest, or which recovered, were usually under treatment from almost the beginning of their illness. All the Europeans were under treatment at an early date as were several of the Japanese who recovered; and although some of the European cases were not severe I think that early and suitable treatment had a great deal to do with the diminished mortality. I regret to say that with the Eurasians this was not so. Two of these were under treatment early but both died, whilst another case which was not diagnosed early died on the seventh (?) day. There is no doubt that European blood and stamina had a good deal to do with recovery, and I say this notwithstanding the fact that they were necessarily more carefully nursed and looked after than some of the Chinese. It must always be borne in mind that an intelligent European had every chance in his favour; he was in the first instance very jealous of his earliest departure from health, and lost no time in placing himself in communication with experienced help; then he was able to explain his own symptoms in his own tongue to a medical man who spoke and understood the same language. Again he had confidence in the power of western medicine to help him, and he was untroubled by the constant dread of the "foreign doctor" which environs not only every ignorant coolie, but the vast majority of the more or less cultured classes of the Chinese nation.

CONVALESCENCE AND AFTER EFFECTS.

When a bubo was opened I found that iodoform was the best application for insufflating purposes.

After a couple of days' treatment by plugging with lint soaked in carbolic oil and smeared over with iodoform the bacilli usually disappeared from the discharge. This was due, I think, to the antiseptics employed, and not to any possible death of the bacilli by the growth of staphylococcus in the pus. In some lymphatic abscesses (in the case of Professor Aoyama), which had been present for several days before opening, the bacilli were found in numbers. Hot corrosive sublimate fomentations were the best external applications in most cases, being cleanly and easily applied. Where the bubo was large, dirty, and discharging freely, poultices of linseed, either alone, or with charcoal and dusted over with iodoform, were preferable. Suppuration was sometimes prolonged for a month or more,

and where this was so a careful examination sometimes revealed a large slough which had completely separated, but which still caused a good deal of suppuration (one more reason why one should open the primary bubo freely). The use of iodine, iodide of potash ointment, mercury, &c., locally, all seemed useless even in the later stages of the bubo which had not suppurated. Treat the debility, and the bubo will disappear of its own accord was what our experience taught us. Not only this but the irritation caused by these applications sometimes led to unpleasant results, which it was well to avoid. As a rule, an open bubo took from one to three months to close, very few healed under a month. Keloid formation on the site of bubo was frequent in the Mongolian subject. Several cases have come to hospital lately to be seen.

The vitality of the tissues after plague reached a lower point, I think, than it does after any other debilitating acute disease. In most cases there was not the slightest reaction of the tissues; if cut they remained almost in *statu quo* for days, and granulating wounds were generally called "granulating" by courtesy.

It was only to be expected that head symptoms would occasionally persist for some time. Irritability, perversity of temper, and headache occurred frequently, and even a temporary aberration of mind in some cases.

The condition of the vascular system generally improved rapidly—after the fever disappeared—under iron, strychnia and arsenic, but even here palpitation, breathlessness, and other signs of cardiac weakness persisted for a time. No case of permanent cardiac *valvular* mischief have I yet noticed however in any of the European patients. In convalescence digitalis has not been prescribed. In the few cases where symptoms of oedema of lung or pneumonia persisted after the fall of temperature the condition improved by good food, tonics, and the occasional application of iodine externally to the chest.

In some cases the sloughing was extensive, and extended by the lymphatic vessels. In these cases no attempt to heal up took place until the general tone of the system improved.

I have seen some cases lie absolutely comatose for several days in the Chinese hospital and recover in a most marvellous manner, but these were the exceptions. The mere fact that a man was comatose for so long a time as four days would point to a bad prognosis; yet in the Slaughter House several cases lay in that condition almost uncared for and recovered without a bad symptom afterwards.

Death occurs by—

(a) Sudden heart failure.

In some cases the slightest exertion caused death, even in those who seemed to be convalescent; and it was of the utmost importance that all movement out

of bed be disallowed. Some cases had this failure brought on while on the bed-pan. Others jumped out of bed in delirium only to be put back, practically pulseless, to die.

(b) Gradual heart failure depending on brain conditions and cardiac weakness.

In these cases the lungs were usually cedematous, and the combination of brain and dyspnoea generally brought about a rapidly fatal result.

(c) Extension of the inflammatory mischief in the neck by causing obstruction.

In these cases nothing could really be done as the state of the patient when it occurred would have made tracheotomy a difficult if not a totally ineffective operation, and would in all human probability have proved fatal. In these cases the amount of cedema and sero-sanguineous exudation all round the anterior part of the neck would have made the operation so tedious that the patient would probably have died before its completion.

(d) Hæmoptysis.

The cause of a couple of deaths.

(e) Hæmorrhage after sloughing buboes.

Two cases of sloughing into the iliac arteries occurred, and death took place almost instantaneously.

(f) Hæmorrhage into the pons varolii.

This undoubtedly helped to bring about a dissolution in some cases.

(g) Pyæmia and exhaustion.

These were occasionally the cause of death, but infrequently.

(h) Meningitis and cerebritis.

These really come under (b).

THE BACILLUS.

The bacillus was found in practically every part of the body to which the blood has access. It was especially abundantly found in the enlarged glands and in the spleen. It was found in the other organs of the body and in the blood, but in fewer numbers. In the bubo and in the spleen they were found in much greater numbers in June than they were in September, and I have no doubt that they are always more numerous in cases where a large hæmorrhagic bubo is present. Slight variation in size was met with. The bacillus taken from the blood looks like a diplococcus, when stained with aniline dyes, the intermediate part only staining slightly. The bacillus taken from the bubo stains almost equally all over at first, but after keeping specimens for some time many of them show the appearance of those found in the blood, the staining of the interglobular part of the bacillus evidently not catching hold of that part so well. The bacilli vary slightly in size even in the same case. The capsule of the bacillus is usually distinct under

the 1-12th oil immersion lens, and is best seen in some of the bacilli from a bubo where the interpolar part is not too deeply stained. The bacilli grow most abundantly on blood serum or glycerine agar-agar at a temperature of from 96°—100°F. The blood serum is not liquified. A culture from blood shows small grey semi-translucent colonies over the surface of the serum. Spore formation has not been noticed. When animals that are susceptible are inoculated with a culture they get rapidly affected and die in a few days, the length of time varying generally according to their (the animal's) size. Mice, rats, rabbits and guinea-pigs are susceptible to the disease. The only pig that I inoculated is still alive, but as I have doubts as to the virulence of the culture a definitive opinion cannot yet be given as to the susceptibility of these animals. Dogs have not yet been proved to be susceptible. The question of the infection of pigs is of the greatest importance, as so much of the meat-supply of Hongkong consists of pigs brought from Pakhoi and Canton, where the disease may become endemic. Strict measures may have to be taken in the case of a recrudescence of the disease in Canton. I can only say that so far as it has been noticed dogs seem to have escaped, dead dogs in the streets being conspicuous by their absence. Whenever a fresh culture of bacilli can be obtained this point will be cleared up.

After animals which had been inoculated died, the point of inoculation was found on dissection to present almost the same appearance as the peri-bubonic tissue in man. The spleen was generally enlarged, and in rats there was well-marked enlargement of the lymphatic glands. Feeding animals on plague flesh and on buboes generally resulted in their death a few days after.

A one per cent. solution of carbolic killed the bacilli after an hour's application. A two per cent. solution killed practically immediately. Quicklime was almost as efficacious. Four days' exposure of the bacilli to fresh air generally killed them—no positive results being obtained from culture after that exposure—whilst bacilli exposed directly to the sun proved innocuous after four hours. (Temperature of black bulb being from 150°—160° F.)

I have already mentioned that the bacillus may be found in the blood six weeks after the acute stage of the disease passed; but this statement must be qualified by the remark that, in the later stages of the disease, it was found that they had generally disappeared in about three weeks.

Patients were not discharged from Kennedytown and *Hygeia* Hospitals until the bacilli had disappeared from the blood; but at the Chinese hospital they were generally kept about two months, i.e., those who recovered.

QUESTION OF QUARANTINE.

On this much debated subject it is perhaps best to say as little as possible. The question of quarantine, or the medical prevention of the introduction of disease, must be decided by each country according to the sanitary state it is in; and upon the history of the disease as I have given it, and upon the facts there recorded the question will have to be settled. The great danger undoubtedly arises in most cases from its introduction by emigrants and their clothing from infected ports. Introduction by merchandise from an infected port though possible is very improbable indeed. If quarantine is to be imposed, it is to be remembered that the incubation period has been proved to extend to nine days. I have no hesitation in saying that if immigration was disallowed in non-affected ports quarantine would be unnecessary; but if emigrants from an infected port are allowed to land then quarantine should be enforced, and more particularly so in the case of Chinese. Their baggage in particular should be most carefully disinfected, as the ways of the "heathen Chinese" are just as peculiar in the matter of clothing as they are in some other things. The risk of the introduction of the disease by other immigrants (the ordinary first and second class passengers) is practically *nil*.

ADMINISTRATIVE.

On May 10th when the epidemic was first discovered the Government Medical Staff available for service was composed of the following Europeans:—

Colonial Surgeon, Acting Superintendent, Government Civil Hospital; Messrs. Crow and Browne, nine Sisters, Mr. Chapman, Steward, Wardmaster Brett, Government Civil Hospital; Wardmasters Cumming and Bayley, Lunatic Asylum.

On the discovery of the outbreak on 11th May the hospital hulk *Hygeia* was moved from behind Stonecutter's Island to West Point within easy reach of the shore, and every preparation was made for receiving a large number of patients on board. These patients did not arrive on that date as was at first arranged, owing to difficulty with the Tung Wah Hospital authorities, but early, on Saturday, 12th May, all the plague-affected Chinese in the Tung Wah were removed to the ship, after a prolonged interview between the Colonial Surgeon, Mr. May and myself, and the Chinese Committee of that hospital. On this day Police Constables Gidley and McKillop were seconded for service in this department.

On the evening of 13th May, Surgeon Penny, R. N., having volunteered for service, reported himself for duty, whilst Surgeon-Major James of the Army Medical Staff, was also sent to assist us and commenced work on the 14th, chiefly under the orders of the Sanitary Board.

On 14th May, owing to the rapidity with which the *Hygeia* had been filled, Kennedytown Police Barracks was placed at our disposal and was immediately opened as a hospital.

On the 11th May, fourteen Chinese "boys," cooks, and coolies were secured to act as nurses on the *Hygeia*, and also three amahs; and on 14th May, eleven more attendants were engaged for Kennedytown; the European staff being distributed between the Government Civil Hospital, Asylums, *Hygeia*, and Kennedytown, with orders to remain at their posts until relieved.

On the morning of the 15th May, it was discovered that almost all the attendants at Kennedytown had disappeared, notwithstanding the fact that they were receiving double wages, and in addition several of the *Hygeia* attendants also decamped, having either swam ashore or dropped into the sea to reach adjacent sampans, whilst the other nurses had been looking after the sick. The Chinese Apothecaries, U I Kai and Chau Kam-tsun, had been detailed to superintend the dispensary and the administration of medicines, one being stationed at Kennedytown, and the other on the *Hygeia*; whilst the Chinese clerks, Leung Fu-chu and Leung Ping-fai, had to keep the registers, and procure as much information about cases as possible. The result of this was that on 16th May in addition to the Medical Officers, the following was the staff that was practically doing twenty-four hours' duty on the *Hygeia* :—

Two Sisters, Police Constable J. McKillop, Wardmaster; Police Constable T. I. Gidley, Wardmaster; A Po, Chinese Wardmaster; One Chinese Apothecary, and Leung Ping-fai, second clerk.

There were also about fourteen Chinese "boys" and coolies to assist. The boatswain and one caretaker of the *Hygeia* (who were in charge of the ambulance boat) had also disappeared. The above staff had to do the whole of the work of getting patients up the gangway, washed, put to bed, given nourishment and medicine, removed when dead, coffined, and conveyed to Kennedytown by boat for burial. In fact they had to do everything, but dig the graves and fill them up.

At Kennedytown the following was the only available staff :—

Two Sisters, Wardmaster Cumming, One Chinese Apothecary, A Ching, Chinese Wardmaster, and about a dozen "boys" with an occasional hour's help from some of the *Hygeia* staff, whilst bodies from the hulk were awaiting burial. The Medical Officers generally had to lend a hand at anything that required to be done.

On 19th May, we arranged to retain the services of Dr. W. F. C. Lowson for additional work. It should be mentioned that at this time the work at the Government Civil Hospital was very heavy, the result being that every European was doing on an average sixteen hours'

duty per diem, the surgical work at the Government Civil Hospital being much more important than is usual.

On 21st May, the Glassworks Hospital was opened, and this relieved our staff to a certain extent. The hygiene of this hospital, however, caused us a great deal of trouble, and it was only by the occasional employment of extreme measures that this place was prevented from becoming a certain death-trap to every one who entered it.

On 15th May, six petty officers from the *Victor Emanuel* were detailed to assist us with the launches; the Chinese crews having shown a disinclination to work; and as a result of their help the conveyance of the living and the dead was greatly accelerated. It also relieved us of the necessity of sending a Wardmaster with the dead to Kennedytown. The necessity of water transit was also diminished, as the sick for Kennedytown now began to be taken by road—not quite so comfortable a method of conveyance as by boat but one which saved the Medical Department a lot of trouble.

On the 27th May, six Alice Memorial Hospital students were engaged by the Permanent Committee to assist; two to look after the sanitation of the Glassworks, and four to assist in town-work. The weather at this time was very depressing being very hot and wet, and oilskins and sou'westers were absolutely necessary for any one venturing out of doors.

On the 28th May, the ventilation of the Glassworks had to be improved by removing all the glass from the windows.

On the 29th May, Wardmaster Gidley and all the Chinese on the *Hygeia* were removed to Kennedytown, as I expected that Europeans might soon be attacked by the disease. This apprehension was justified as one Shropshire man was admitted the same afternoon, and two on the following day. After this the *Hygeia* was kept solely for Europeans, Japanese and Eurasians, no more Chinese being taken on board.

On the 31st May, it was discovered that the Alice Memorial students had fled from the Glassworks, some of their relatives having unfortunately died, but we soon got help from the Army and Navy Authorities as Privates J. R. Makin and H. E. Hussey of the Army Medical Staff Corps were seconded (on the 8th June) for services in the Glassworks; whilst Sick-Bay Steward Mitchell and Sick-Bay man George Smith from the Naval Hospital arrived on the 9th to render further assistance; and improvement in the condition of that place at once took place; the result of obedience to our orders.

On the 7th June, I offered to take charge of the whole of the nursing and medical department, an offer made because the Chinese had mismanaged (medically and sanitarily) the Glassworks Hospital; and also because we

had been promised assistance in the way of attendants by Major-General Barker. We were quite in a position to make this offer as a result of our experience of the previous month, and also from the fact that we were now fairly well provided with medical men. However, the Permanent Committee said "no."

The Slaughter House Hospital was opened on 8th June—a building well suited for the occasion, with brick walls, concrete floors, fairly good ventilation, and easily kept clean. In my opinion, however, it was not nearly so good as the old Cattle Depot which, in addition to good drainage and floors, had magnificent ventilation, long stalls, which would have made splendid wards, equally easily kept clean; and where a small nursing staff could have looked after a large number of patients.

By Saturday, June 16th, all the patients in the Glassworks had been removed to Canton or to the Slaughter House Hospital, and the place was shut up.

The mat-shed erected opposite the Glassworks was opened on June 17th under the medical supervision of the Alice Memorial Hospital Staff. Owing to the want of proper drainage here, and to the usual tendency of the Chinese, when not looked after, to throw rubbish about, an insubstantial pool of rubbish accumulated at the southern end of the shed which had to be carefully watched to prevent a recurrence. The ventilation of the mat-shed was necessarily good, as large open spaces had been left between the walls and the roofs, and windows and doors were plentiful. This hospital was closed on July 21st, the experiment having proved rather expensive.

On June 19th, Dr. J. F. Molyneux arrived from Ningpo to assist in the medical work, and on June 24th, Surgeons Meaden, R.N., and Bearblock, R.N., also arrived, and, under the orders of the Permanent Committee, proceeded with the inspection of junks and vessels arriving from Canton and Macao. Their services were really not required as, with the co-operation of Dr. Molyneux, the staff associated with me was now quite sufficient for the work which had to be done. A judicious interchange of work, however, enabled the latest arrivals to see a good lot of the plague, and allowed some of those who had been working on shore all along to have a few days' fresh air on the water. The junk inspection might have been effective two months earlier.

Dr. Molyneux left on 19th July; Surgeons Bearblock and Meaden about the end of the same month.

On 10th August all the patients in the Slaughter House Hospital were removed to Kennedytown Hospital, and the former place was cleaned up and thoroughly disinfected by carbolic acid, all fittings which had been used being burned. The Alice Memorial Mat-shed on

closing was disinfected by carbolic acid freely applied to the floors, whilst most removables in the way of beds, tables, &c., were burned, or freely treated with carbolic acid. A typhoon in September completed the disinfection by '... out of sight. The disinfection ... was done by carbolic acid and quicklime applied to the walls; all wooden floors being removed and burnt, and the refuse added to the flames. The *Hygeia* was closed on August 8th, the two European patients being transferred to the Civil Hospital. Disinfection here was done by carbolic acid and fresh air.

Kennedytown Hospital was closed on September 26th, the remaining patients being removed to the small-pox observation hut in the Civil Hospital grounds. This hospital was also disinfected by carbolic acid, whilst the convalescent mat-shed adjoining was conveniently removed piecemeal by successive typhoons in September and October. This mat-shed had been erected early in June, it being essential to transfer patients to another ward after the acute stage of the disease was over. By this arrangement we had always two lots of patients, one lot requiring very little actual nursing, and the other lot all together in the place where the nursing had to be done.

The *Hygeia* proved a most valuable hospital for Europeans, every medical visitor being greatly impressed with its suitability for this purpose, providing as it did plenty of fresh air, every breeze in the harbour, no mosquitoes, and the charm of sea life during convalescence. It would probably have gone very hard with some of the European patients and the Japanese doctors had they been treated on shore, every slight breeze in the harbour bringing great relief to the sufferers. When the rush of Chinese patients came, however, the ship was rather taxed for accommodation, as one private ward had to be used as a mortuary, another as an office, and the others to accommodate the extra staff, &c, which was necessary. Her use as a European hospital during last summer alone has more than justified her existence.

Kennedytown Barracks proved a fairly good hospital, but its proximity to the trees on Mount Davis made it a hunting ground for flies and mosquitoes which sometimes added greatly to our patients' sufferings. The arrangements of the rooms also left much to be desired.

The Commissariat of the Chinese Hospitals at the Glassworks and at the Slaughter House Hospital was in charge of the Chinese themselves. In the Glassworks the food was principally used by the attendants, the patients not requiring very much, or when receiving it receiving what was unsuitable. As one or two cases began to recover, however, the arrangements began to improve, and at the Slaughter House Hospital, when affairs were running smoothly,

the commissariat was efficient as far as supply was concerned. The supplies and furnishings to the *Hygeia*, Kennedytown Hospital and Alice Memorial Branch were under the charge of Mr. Robert Chapman, the Steward at the Government Civil Hospital, with Sergeant Smith, R. A., specially detailed to assist him in Alice Memorial Branch work from June 20th to July 21st. The amount of work done by Mr. Chapman was almost incredible, and I trust that the Government may be able to satisfactorily reward this officer, who was constantly at work from shortly after 5 A.M. till 10 P.M. It must be remembered that all this time he had his Civil Hospital work to do also; and when one considers that on no single occasion was there any delay in the delivery of or want of supplies, one can only come to the conclusion that it was a hard bit of work well done.

Dispensary hours were long at the commencement of the epidemic, but after getting large supplies of "stock" mixtures made, we were able to arrange matters so as to allow Mr. Crow and Mr. Browne to devote a considerable amount of time to disinfecting work in the town.

The details as to the changes of the nursing staff were left to Miss Eastmond, our matron, and we were able to arrange that the sisters, after being on plague duty for a week, were on duty during the following week at the civil Hospital, where the work, though as heavy, was not disgusting or depressing.

During the epidemic two wards were kept at the Government Civil Hospital for observation purposes. This was necessary, as cases of plague turned up at this hospital during the night; and as coolies to transfer them to Kennedytown at once could not be procured even at very high wages, these had to be kept till morning.

If ever this Colony has had reason to congratulate itself it was when we were able to procure well-trained British nurses. I think the greatest compliment that I can pay these ladies is to say that, had it not been for their presence there could have been no well-run epidemic hospital during last summer. Amateur nurses at the beginning of an epidemic, or indeed at any stage where there is a rush, are worse than useless, and multiply the worries of a medical officer *ad finitum*; not only this but all outsiders took care to give our hospitals a wide berth. When the hospitals were crowded, it was often a matter of difficulty for the medical officers employed to keep their meals on their stomachs. It would have been much harder if they had had to remain in constant attendance all the time as our sisters had to do. Small-pox is bad, but there is something specially awe-inspiring in plague, which seems to appal the onlooker. Cholera and small-pox show external evidences which make a spectator aware of the existence

of a severe disease, but to witness rows of plague patients dying off in a hospital has, I am sure, a much more depressing effect on by-standers than the two diseases I have mentioned.

The carbolic mouth-wash for the soldiers employed in cleansing work was made up regularly twice a day at the Civil Hospital for some weeks, the following formula being used:—

R. Ac. carbolic liquid	... m. 160
Eau de cologne	... m. 140
Spirit camphor	... m. 180
Aquam ad	... oz. iv

ft gargarisma.

Quinine in 5-grain doses was also served out to every soldier by the army authorities.

Among the attendants at the various hospitals there is evidence of at least three deaths. The Italian sister who died of the disease was nursing at the Alice Memorial Branch Hospital, and got infected by excessive zeal. Her death was very much regretted, as it was the only death in a European hospital; and we had by this time got so far through the epidemic without loss that it seemed probable every attendant would come out safely. The dangers of nursing should have been carefully pointed out to her. An ayah at the Slaughter House Hospital became infected and died after removal to Lai-Chi-Kok. An attendant at Lai-Chi-Kok Hospital, finding himself attacked by plague, promptly came over to Hongkong and walked up to Kennedytown Hospital, where he afterwards died. It is to me a source of keen gratification that none of the attendants in the Government Hospitals were attacked.

Rules had to be made regarding visitors in the Chinese hospitals, as many people wanted to see friends and relations. These rules were simple:—(1) visitors had to be escorted by the Chinese policeman, and might talk to a patient for five minutes but without touching him; (2) anyone wanting to stay longer and assist a patient was detained, and reckoned as an ordinary hospital attendant until the patient was better, and then had to undergo a few days' isolation and disinfection.

We were able to keep an observation ward in the Slaughter House Hospital.

STATISTICAL.

The following table gives the admissions and deaths of those treated in the Government hospitals:—

"Hygeia."

	Total.	Plague.	Observation.	Deaths.
May	... 157	143	14	114
June	... 11	8	3	1
July	... 3	3	...	2
	171	154	17	117

Kennedytown Hospital.

	Total.	Plague.	Observation.	Deaths.
May	... 71	67	4	68
June	... 121	115	6	90
July	... 39	28	11	17
August	... 95	51	44	31
September	... 8	2	6	2
October	... 1	1	...	1
	335	264	71	200

It will be noticed that in August and September the proportion of observation cases was large. It was most essential at this period that all possible foci of disease should be removed; and it must be remembered too that at this stage of the epidemic, apparent glandular swellings were seldom met with. Of the fifty-one cases of plague admitted in August only eight had visible buboes when admitted; whilst only two developed them in hospital.

(To be continued.)

A Mirror of Hospital Practice.

LIGATURE OF THE EXTERNAL ILIAC ARTERY FOR ELEPHANTIASIS.

By SURGEON-MAJOR G. H. FINK,
Bengal Medical Service.

CHUJJO, Hindoo male, cultivator, *æt.* 30 years, 5' 10" in height, a native of Bijnor District, was admitted into the Sadr Dispensary at Bijnor for elephantiasis of the lower extremities on the 15th of February 1890 as an in-patient.

General history—Patient is a strong individual, of good constitution, height 5' 10". There is no history of gout, rheumatism or syphilis present.

Family history.—No member of his family has suffered from a similar disease as far as he is able to tell.

Past state of health.—Has always enjoyed excellent health.

Present illness.—Noticed an enlargement of both thighs two years ago; the enlargement extended down the legs to both feet and the tissues became thick and hardened gradually. Three months ago the scrotum began to enlarge and become thickened.

Present state of health.—Patient is a well made individual, 5 feet 10 inches in height, of a dark mahogany complexion, subject to attacks of intermittent fever, but otherwise in very good health, and has a good appetite. Both lower extremities are swollen, thick and enlarged, presenting horny and warty excrescences at the instep and root of toes on the dorsal aspect, and he finds it difficult now to walk about owing to his present condition. The scrotum is enlarged and thickened, dark in colour; penis enlarged, pendulous and curled up at prepuce like a corkscrew.

All the other organs of his body are healthy.

Diagnosis.—Elephantiasis.

Prognosis.—Doubtful.

Treatment.—After giving the patient rest in bed and a purgative on the day preceding, it was resolved to ligature the external iliac artery. On the 18th February 1890, patient was placed on the operation table under chloroform, and the following measurements were taken of his lower extremities:

	Right Extremity.	Left Extremity.
(a) Upper third of thigh	... 1' 11"	1' 9"
(b) Middle of do.	... 1' 10"	1' 8"
(c) Over knee-joint	... 1' 4"	1' 4½"
(d) Round calf	... 1' 4½"	1' 4½"
(e) Across heel to instep	... 1' 6"	1' 4"

Circumference of scrotum 1' 3".

The scrotum and pubes having been shaved and washed with perchloride of mercury solution (1 in 2000) the incision for ligaturing the right external iliac artery by Abernethy's method modified by Liston was made, *viz.*, one inch above Poupart's ligament and half an inch outside the internal ring curving up to a point one inch above and internal to the anterior superior spine of the ilium. The skin, fat and superficial tissues being divided with the external oblique aponeurosis, the knife by light and gentle touches along the concave edge of the wound soon divided the internal oblique and transversalis, exposing the fascia transversalis which was picked up carefully with the point of the forceps near the internal ring, and a small nick made in it for inserting the director upon which the fascia was divided very cautiously to the full extent of the wound.

A retractor was placed along the inner edge of the wound to give a clearer view of the parts and to allow the fingers to remove the peritoneum from the iliac fossa. Assistant-Surgeon Ranjit Singh Sarin was better able with his fingers to retract the inner tip of the wound, whilst I stripped the iliac fossa. After cleaning the space and judiciously tearing through the connective tissues, whilst my assistant's long fingers kept the peritoneum away, I was able to feel the external iliac artery pulsating at the brim of the pelvic inlet, but its pulsation was considered somewhat feeble for a large artery of its size. Careful search was now made for the small genito-crural nerve which was gently held aside, the sheath of the artery being now opened, an aneurism needle threaded with a stout catgut ligature was carefully passed from within outwards.

It was now considered necessary to feel for femoral pulsation in Scarpa's triangle, which was tried several times with the thigh flexed and slightly abducted, but no femoral pulse could be felt either by myself or Assistant-Surgeon Ranjit Singh Sarin. We now tried for the femoral pulse in the left thigh, and could feel it but very feebly. Having once again felt for pulsation in the external iliac artery (right), which we both considered very small for so large an artery, I firmly tied the vessel with a stout catgut ligature

The wound was now washed out with bichloride of mercury solution (1 in 10000), a small drainage tube inserted at the inferior angle of the incision, and sutures applied. The wound was dressed with iodoform, cotton-wool, with a bandage over all, and the patient put to bed in a comfortable position.

R

Pil. opii ... gr. ss.

Liq. to be given half an hour after the effects of ehloroform have passed off and another pill at bed-time.

Diet.—Milk only.

The patient's condition after the operation gave cause for much anxiety for a day or two, as he complained of severe pain diffused in character, but the knees were not drawn up, and the pulse was not characteristic of peritonitis having set in. His temperature is as given in the accompanying chart.

For a few days after this, he complained of embarrassment in his breathing; his tongue was dry, and there was a slight dry cough, which symptoms were attended to promptly and passed off. His general condition showed great weakness however. The wound healed, although there was a slight discharge of laudable pus for a few days.

Strict attention was paid to his diet, and I was obliged to order stimulants and reduce his temperature which rose every evening with a morning fall, by administering tartar emetic and quinine. He soon began to improve, and there was a remarkable diminution in the size and feel of his thigh first, which gradually extended to the knees, and steadily extended even to the feet. Dimensions were taken at different dates for comparison as given below; his scrotum also reduced in size and instead of being dark assumed a healthy pinkish colour. I was anxious to retain the patient longer in hospital, but he begged to be allowed to go to his home as he had land to cultivate, and he said that he was certain that in less than a couple of months he would be quite himself again and he would then come to see me at the dispensary which he did six months later, and there was a considerable improvement in every respect.

Moreover he said he did not feel that weight and dragging of the lower limbs as he had done previous to the operation being performed.

25th February 1890.	2nd March.	14th March.
(a) 1' 8"	1' 8"	1' 7"
(b) 1' 4"	1' 5"	1' 5"
(c) 1' 0 $\frac{1}{2}$ "	1' 1"	1' 6"
(d) 1' 1"	1' 1"	0' 11 $\frac{1}{2}$ "
(e) 1' 3"	1' 3"	1' 2 $\frac{1}{2}$ "

Patient was discharged from hospital feeling much better, and most hopeful of complete recovery, on the 19th March 1890. The reduction in the size of the limb before and after the operation will speak for itself as regards the success of the operation and the benefit derived.

A CASE OF HEPATIC ABSCESS—OPERATION AND RECOVERY.

By RAM DHARI SINHA, L.T.M.S., in Medical charge,
Civil Hospital, Abu Road, Rajputana.

WALI MAHOMED, æt. 36 years, butcher by occupation, resident of Abu Road, in Sirohi Territory, Rajputana, came to the hospital, suffering from abscess of the liver.

Previous history.—Last winter (1896) he suffered from acute lobar pneumonia, and has been suffering from chronic dysentery and malarial fever of an intermittent kind for the last three months. He complained of pain in the hepatic area.

Present condition—I. *General.*—Very weak and prostrate (*typhoid condition*); complaints of intermittent fever with chills and rigors; no appetite whatever; great thirst and constipation.

II. *Local.*—Great pain and tenderness over the hepatic area, pain of an aching and throbbing character; swelling about the size of a hen's egg between the ninth and tenth ribs.

On palpation, fluctuation was detected, and I determined to open the abscess.

On the 8th October 1896, after rendering my hands, instruments, &c., antiseptic, I made an oblique incision with the scalpel about 2 $\frac{1}{2}$ inches between the ninth and tenth intercostal space; about three pints of thick, offensive, sanguinolent pus escaped freely. The cavity was syringed with sublimate lotion (1 in 2000); an India rubber drainage tube inserted; the opening was covered with a piece of lint previously soaked in carbolic oil (1 in 20) and smeared over with iodoform and bandaged. The dressing was changed twice daily. On the fourth day after the operation, the exit was found blocked with some debris of sloughing hepatic tissue; about five ounces of pus escaped on enlarging the wound. From this time the cavity began to fill up gradually and slowly, and the discharge decreased. The tube had to be shortened every alternate day till it was altogether removed. He was discharged cured on 24th November 1896. The following mixture with spiritus vini gallici ʒiv and aqua ʒi, twice daily was continued throughout:—

R

Ferri et Quinæ citras	gr. iii
Acid Nitro-hydrochlor. Dil.	m x
Liqr Hydrargyri perchlor.	ʒss
" Strychniæ Hydrochlor.	m. v
" Fowlerii	m. iii
Tinct. Gentianæ Co.	ʒss
Aqua Mental pip ad	ʒi

For constipation, he was given a pill consisting of pilula hyrargyri, gr. ii; pilula colocynt hæ comp., gr. iii; and enonymin, gr. $\frac{1}{4}$; every H. S.

Remarks.—He was quite free from malarial cachexia at the time of report. I am of opinion that the abscess was most probably due to malarial influences, as he greatly improved during the antimalarial treatment. He is at present keeping good health.

PIRATION.

ntiasis.

February 1890.

March 1890.

Dates of Observation.	18	19	20	8	9	10	11	12	13	14	15	16	17	18	19
Days of Disease	1	2	3	19	20	21	22	23	24	25	26	27	28	29	30
Temperature Fahrenheit.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.
103°	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.
107°
106°
105°
104°
103°
102°
101°
100°
99°
98°
97°
96°
PULSE PER MINUTE	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.
RESPIRATIONS PER MINUTE	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.
BOWELS (No. of Stools)

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CALCUTTA.

Indian Medical Gazette.

FEBRUARY, 1897.

TRIENNIAL REPORT ON THE WORKING OF THE CHARITABLE DISPENSARIES UNDER THE GOVERNMENT OF BENGAL, FOR THE YEARS 1893, 1894, 1895.

IN no branch of the great administration of this country do we greet progress with so much pleasure as in that of which the Inspector-General of Civil Hospitals, Bengal, treats in this Report. The statistics published annually are not attractive to the general reader, but the well-digested remarks made in this triennial report by Surgeon-Colonel G. C. Ross give us an excellent idea of medical progress up to the present time and medical requirements in the future. Additional value is given to the report under notice by the fact that it includes figures not only from the Government and Local Fund Dispensaries under Municipalities and District Boards, but also from the Lady Dufferin Hospitals, Dispensaries maintained by Railways, the Irrigation Department, Wards' Estates and private charities. During the years under review:—

"The total number of dispensaries has increased from 310 in 1893 to 430 in 1895. In Class I—State Institutions—there was an increase of 10 in 1893, 12 in 1894 and 2 in 1895. These additions do not, however, represent an actual increase, but are chiefly due to the inclusion in the returns of institutions which were in existence before, but were not on the Government list. The number of Class II dispensaries [under the control and administration of District Boards, Local Boards and Municipal Committees and relying in the main on local funds] increased by 16 in 1893, 9 in 1894 and 31 in 1895. In Class IIIA—Dispensaries entirely supported by private individuals or endowment—there was a total addition of 27 dispensaries. In Class IIIB—Institutions maintained from private sources, but either subsidised by Government or Local Funds—there was a total increase of 13."

Of the new dispensaries 56 are managed by District Boards and in time, perhaps, all these

bodies will follow the laudable example set by the Faridpur District Board. This Board has "decided to establish a dispensary at every police thana, and has already given practical effect to this decision by opening five new dispensaries during 1895." The majority of the dispensaries are officered by assistant-surgeons or hospital assistants who are Government servants, but a large proportion is in charge of local native doctors appointed under Rule 9 of the Dispensary Manual to hospitals in Classes IIIA and B. The Inspector-General of Civil Hospitals thinks that the privilege of private appointment under Rule 9 is often abused and that, in consequence, the dispensaries suffer. We do not believe in removing altogether the right enjoyed by these managing bodies of selecting their own medical practitioner, but unsuitable appointments would occur very seldom if they were called upon to submit their selections to the Inspector General of Civil Hospitals with whom the final appointment might rest. We are told that Government and other hospital assistants have been granted improved conditions as to pay and house allowance, and that they are "now a fairly contented body of men." If their educational qualifications and their love of work could only be improved in a similar ratio, this excellent feeling of contentment would no doubt spread to those officers who are mainly responsible for the work done by these subordinates. The inspections of dispensaries by the Civil Surgeons of the various districts have increased, but it does not appear possible for them in all cases to carry out the required number. The Civil Surgeon has many masters, and his main duties lie at the head-quarters of the district in which the principal hospital of the district is situated, and where he generally has charge of the jail and is responsible for the medico-legal work of the district. In the Government Resolution accompanying the report we read that:—"A scheme for the reorganisation of the sanitary department is now under consideration, which will materially facilitate the inspection of dispensaries both by Civil Surgeons and by the head of the Medical Department."

Paragraph 9 of the Inspector-General's report deals with the popularity of medical institutions as gauged by the attendance statistics, and we quote it freely:—

"Statement II of the appendix attached to this report shows the number of in-door and out-door patients treated in the various charitable dispensaries during the year 1895.

This information is condensed in the following table for easy reference :—

Years.	In-door.	Out-door.	Total.	Population of the province.	Ratio per cent. of total treated to population.
1893 ..	40,589	1,885,089	1,926,528	*70,665,427	2.72
1894 ..	43,824	2,241,626	2,285,450		3.23
1895 ..	45,243	2,484,536	2,479,779		3.51
Total ..	129,656	6,562,101	6,691,757	*70,665,427	9.46
1890-91-92	103,364	4,275,071	4,870,335	*70,665,427	6.19
Increase	26,292	2,286,130	2,312,422	.....	3.27

"In this respect the Lower Provinces compare very unfavorably with the Central Provinces, the Punjab and the North-Western Provinces. I have not yet received the figures of other provinces for 1895, but those of 1894 compare as follows with the Bengal figures of 1895 :—

	Number of Dispensaries.	Number of Patients.	Number of Patients to each Dispensary.
Bengal ...	427	2,479,779	5,807
Central Provinces ...	86	1,202,497	13,982
Punjab ...	255	3,499,923	13,725
North-Western Provinces.	312	3,941,761	12,633

One of the chief causes of low attendance in Bengal; is the large number of private practitioners and druggists' shops which exist in all parts of the province. Anyone with a smattering of medical knowledge, and even without it, can and does set up as a private practitioner. There is absolutely no prohibition in this respect, and I believe there is actually a so-called medical school in Calcutta, which grants medical diplomas, although it has no charter, and is not even affiliated to the University or to any recognised medical institution. The result is a flood of ignorant indigent practitioners let loose amongst a prosperous population. This, in itself, is sufficient to account for a low attendance at the dispensaries. In other provinces there are not so many private practitioners, and the people are poorer. Another reason why Bengal dispensaries are not as popular as they might be is the quality of the subordinate medical officers in charge of them. There is a marked difference in this respect between the subordinate medical establishment of Bengal and that of other provinces, which no one who has had experience in other parts of India can fail to notice. In the first place there is undoubtedly a higher sense of discipline in other provinces than seems to exist in Bengal, which probably is the root of the evil in the Lower Provinces, where I am sorry to say instances of malingering,

and other methods of shirking unpleasant duty are surprisingly common. With faults like these, subordinate medical officers can exercise little or no influence over the servants under them, and it all re-acts on the attendance. Another factor in this connection is the supply of medicines, which is deficient in Bengal, as is also the attention bestowed by the medical officer on the patient. After all, it is the doctor principally that makes a dispensary popular or the reverse. This is illustrated at Ranaghat, where, at Mr. Munro's dispensary, the daily attendance is 350, while at the Municipal dispensary it is less than 10. But how can a dispensary be popular, when, as is generally the case in Bengal, the medical subordinate in charge of it closes the institution after a couple of hours' work in the morning, which he scamps and does not put in an appearance again. This is a common practice; and again, the supply of instruments and surgical appliances is altogether insufficient even in the larger hospitals. The beds also in most places are of the most uninviting description, and what bedding there is, is scarcely better than rags."

We fear that this statement is in the main only too true, but it is also an undoubted fact that the people of Bengal are very averse to attending hospitals even when well worked. To subdivide further, we may point out that the attendance at the Behar dispensaries is greater than at those in Bengal Proper. This difference can have little or nothing to do with the personality of the medical subordinates and must be sought in the character of the people. Another strong objection which exists in Lower Bengal is that of herding together in one ward of all castes. This might be remedied to some extent by the sub-division of hospital buildings into smaller wards. No doubt to Western nations this idea seems, as indeed it is, absurd; but it exists and will only be removed by time, experience and education.

The medical school to which Surgeon-Colonel Ross alludes is no doubt the so-called "College of Physicians and Surgeons" in Calcutta, an institution to which we have previously drawn attention in this Journal. It behoves the Government of Bengal to enquire into the educational standard adopted in that medical school and to regulate its working by means of a proper charter.

The increasing confidence of the people is shewn in the marked improvement which takes place yearly in the surgical work done at the various dispensaries in Bengal. In 1890 the figures were :—Major operations 6,579, minor operations 59,786. The increase in major operations has been very gradual and is represented by about 2,000 per annum. We cannot believe

* This is exclusive of the population of Calcutta, but inclusive of the Chittagong Hill Tracts.

that the surgeons in charge of districts and dispensaries were worse in 1890 and before than those in charge in 1893 or in 1895, when the number of major operations had reached 13,026. For this reason we deprecate the free advertisements which are given to certain civil surgeons who have been fortunate enough to hold large stations, which yearly show an increasing number of operations, both major and minor. Nor, again, can we believe that the surgical staff in Bengal is so much inferior to that of the North-Western Provinces or the Punjab as must be accepted if, like Surgeon-Colonel Ross, we argue from statistics only.

The remainder of the Inspector-General's report is of a financial nature, but we will quote another of his Bengal experiences in the matter of incorrect returns:—

"But I find that in Bengal it is the practice for everything connected with office work to be left entirely in the hands of a semi-educated clerk on Rs. 25 or 30 a month, the average district medical officer taking little or no trouble in the matter himself."

A somewhat bulky appendix contains reports from separate dispensaries and various tabular statements. We quite agree with the Inspector-General that the separate reports from 427 dispensaries are quite unnecessary in the Triennial Report. Nearly all the information they contain is to be found in other parts of the report.

PLAGUE IN BOMBAY.

WE are sorry to note that there is no improvement in the prevalence of plague in Bombay. Far from this being the case, the deaths from this cause are gradually increasing. The effect on the town is disastrous. We read that in one ward alone more than one thousand shops are closed, two hundred houses shut up, and many houses, which usually contain a fair number of inhabitants, are only tenanted by keepers. The description of parts of Bombay remind us of the accounts given by DeFoe of the desolate streets of London during the plague of 1665. Nor is this all. Bombay is now quarantined by every port that has direct communication with her. Her trade is temporarily ruined, and it will be a long time before she recovers her former prosperity.

The authorities of Bombay have unfortunately been slow to recognise the gravity of the situation, and it is only now, after the visit of Surgeon-Major-General Cleghorn, that ade-

quate measures are likely to be taken to arrest the ravages of this disease. We are pleased to see that a large number of medical men have been deputed to Bombay on special duty, and that encampments are being formed for the purpose of separating the healthy from the sick. We hope, however, with this measure, the sick will not be allowed to remain in crowded localities, for, without the provision of good nurses to attend to the patients and to secure segregation, the usefulness of the first measure is likely to be rendered futile.

We reiterate what we have stated over and over again that these measures to be of avail must be carried out on the first signs, not of an epidemic, but on the appearance of the first cases, mild or severe. It is a suicidal policy to allow this disease to acquire a hold on any locality when it is possible by prompt measures to stamp it out at its commencement. Possibly, the measures recommended may be considered to be unduly severe and costly; but when we recollect the terrible consequences of inaction, with its resulting epidemic, there ought to be no hesitation whatever in doing what is necessary. Hitherto, health authorities have been too apt to wait until deaths have occurred from plague, and to rest their diagnosis of the disease on its fatality. Recent researches indicate that, like other epidemic diseases, plague has its mild form as well as its severe, and it is instructive to learn from the paper recently read on plague by Dr. Cantlie before the Epidemiological Society of London, that the Calcutta cases of *pestis ambulans*, which were received with so much incredulity and almost derision by the Medical Board in Calcutta, were considered on their merits in London, and classed along with the cases of *pestis minor* that had occurred in Mesopotamia and Astrakhan in the seventies, and which had preceded outbreaks of plague in those districts. In this connection, it is a remarkable fact that in the Far East, as stated by Dr. Cantlie in his paper "From Singapore, the Straits and along the Coast of China as far as Shanghai, between the years 1891 and 1896, we have accounts of a singular affection of the inguinal glands which occupied the attention of the Singapore and Hongkong branches of the British Medical Association." He mentions also another form of glandular idiopathic enlargement which was observed to occur in children in an epidemic form. We reproduce Dr. Cantlie's description of

the glandular affection among children in Hongkong. "In the year 1891, I reported twenty-three cases at the Medical Society of Hongkong, and since that date cases have frequently occurred. The affection consists of an enlargement of one gland, seldom more in the necks of children over the sterno-mastoid about the middle of its length. The swelling is seen upon the sterno-mastoid, but it might be found to commence, were it met with early enough, in a gland on its anterior border. The disease appears infectious and is attended by feverishness. There is no throat affection, nor is the seat of the disease in the parotid. We, the medical practitioners, styled the condition for convenience sake mumps, but we all admitted that neither the parotid nor the submaxillary glands were the seat of trouble. It will be remembered that the term "peculiar form of mumps" was employed by some to designate the Astrakan disease in 1877."

In the years 1893-94, and since in Hongkong, cases of fever of a typho-malarial type occasionally presented, in the third or fourth week, a general enlargement of lymphatic glands, which lasted for a week or ten days and then subsided. They were deemed interesting cases at the time, but, with the fresh light thrown upon them by recent investigation, more especially the researches in Calcutta, they assume a new aspect.

Thus, the more the matter is enquired into, the more evident it becomes that only in exceptional circumstances does plague immediately acquire epidemic proportions in a locality, and it appears that epidemics are more usually ushered in by the occurrence of a succession of mild cases of *pestis ambulans*, sometimes called (*pestis minor*). And it is important that medical practitioners should be made acquainted with this form of the disease, and with its relationship with the more fatal type of the disease. For, it is obvious that if the connection between these forms of disease is granted, it is the mild forms which are likely to escape detection in the first instance, and, by their spread, lay the seeds of an epidemic which may become uncontrollable.

THE MEDICAL BOARD OF CALCUTTA.

THE constitution of the Medical Board appointed for the purpose of preventing and checking the plague throughout Bengal has been

the cause of considerable surprise and discussion. One would naturally expect that, in a grave crisis such as has to be dealt with, the most experienced sanitary and medical officers would have been selected as members of this Board. Instead of this we find the President, who naturally has the guiding of the deliberations and findings of the Board, a layman, with no knowledge whatever of the problems with which he has to deal. In addition to this, there are two engineers, a member of the mercantile community and three medical men, none of whom can be said to have had any special or extensive acquaintance with the manner in which epidemics require to be met and dealt with. The recommendation of such a Board cannot inspire confidence and are not likely to be efficient even if costly.

The name Medical Board may inspire confidence, but as applied to the present constitution of that Board, it is a misnomer and misleading;—the name implies a body consisting mainly of medical men, and the very best and most experienced men should be appointed under the presidency of a medical officer who has had special opportunities of dealing with epidemics and large bodies of men. Such an officer we would point out is Surgeon-Colonel Hutcheson who, as Sanitary Commissioner of the North-West Provinces, possesses unusual experience in dealing with the immense fairs at Hurdwar and Allahabad, and, moreover, has had to deal with outbreaks of plague in the Kumaon District. At all events, whoever the President may be, he should be a medical man and selected for his special knowledge of sanitation and the prevention of epidemics.

Medical News.

PESTIS AMBULANS.

THE Government of India have very wisely issued instructions with regard to reporting of cases of plague. They direct that all cases, whether fatal or not, should be reported and the cause if possible ascertained, *viz.*, whether imported from an infected area, amongst passengers by train, or whether of apparent local origin.

There appears to be a difficulty in the strict observance of this order, inasmuch as the Medical Board have decided, that cases of fever with glandular enlargement are ordinary non-venereal buboes and not connected with plague. Perhaps since the publication of Dr. Cantlie's paper on the plague in China, and his references to the

prevalence of *pestis minor* or *pestis ambulans* preceding and following epidemics of plague, the Medical Board may be induced to reconsider their former decision. If not it will be for the Government of India to issue instructions as to whether these cases are to be reported or not.

EPIDEMIOLOGICAL SOCIETY.

PROFESSOR LANE NOTTER, PRESIDENT, IN THE CHAIR.

Friday, December 18th, 1896.

SPREAD OF THE PLAGUE.

DR. CANTLIE read a paper on the spread of the plague during the last forty or fifty years. He described the geographical distribution of the disease as bounded by the tropic of Capricorn to the south, Southern China and Formosa to the west, the Canary Islands to the east, while to the north it was less defined, extending in Central Asia and Russia as far as latitude 60°. It had been known by many names—as malignant petechial or hæmorrhagic and bubonic typhus, etc., but he would propose *polyadenitis maligna*, since in 90 per cent. the glands were affected, but the swellings, not being septic, were not properly buboes. The cerebral, nephritic, and cardiac symptoms varied in different outbreaks. It was favoured by filth and overcrowding, but its essential cause was a specific bacillus, identified by Kitasato. There was an interesting disease known as *pestis minor*, distinguished by a very low mortality, which sometimes preceded or followed epidemics of the true plague, its relation to which was disputed; but Kitasato's conclusion that it was dependent on the same bacillus, but in an attenuated or benign phase was doubtless correct, and to this form of the disease Dr. Cantlie was inclined to refer the various febrile adenitic affections that from time to time prevailed within the plague-area. The contagiousness of the plague was undoubted, but while few members of a Chinese household would escape, none of the medical men in Hongkong and only two or three of the European nurses were attacked, the victims having been mostly among the soldiers who volunteered for scavenging and sanitary work. Before or during every epidemic, rats left their holes to die by thousands with all the characteristic symptoms; and in Yunnan, where the dead were often left unburied, Dr. Morison had observed dogs, jackals, and swine to be attacked later, though never primarily as were the rats. The incubation period was from three to six days, though it was apparently longer in the cases on board the *Dreadnought*, and some others at Calcutta and elsewhere. The progress of an epidemic was always slow, though large numbers of persons would be attacked almost simultaneously in a district or town. The effects of high temperatures, heavy rainfall, or draught were re-

markably various, but where men slept on the roof, a fall of rain led to overcrowding within doors, which might occur in the most sparsely peopled countries. High temperatures seemed to favour it, but it persisted in Russia where the thermometer was below zero.

Dr. Lowson, of Hongkong, had attended 5,000 cases in the years 1894 to 1896. He and Drs. Kitasato and Takaki denied that the bacilli found by Yersin in the soil had any resemblance to that of the plague, and had little or no faith in his serum treatment. Fomites were, he maintained, important factors in the spread of the disease, and probably explained the alleged instances of long incubation, though in some of these persons the mild and chronic form might have developed into the acute. Dust and dirt were the chief vehicles; it was from these that the soldiery were infected; mere proximity to the sick was not dangerous. The poorer refugees carried the disease by land, or very short distances by sea, but could not afford long voyages. In China infected clothes were always sold, in Hongkong they were steamed or destroyed. The Chinese and Japanese were far more susceptible than Europeans, and their mortality was much higher—80, 90, or a 100 per cent. This, and the fact that the plague had never obtained a permanent footing in the plains of India, could not be wholly explained by the habits of the people, for the Japanese were the cleanest nation in the world. The case mortality among Europeans was never higher than 20 per cent. Disinfection of houses by chlorine and saturation of the filth on the floor with the acid liquid before removal was always effectual and free from risk; dust from dry filth was most dangerous. All Yersin's work was suspicious; inoculations from buboes were mixed but those from cultures from urine or saliva, which were purer, were fatal to susceptible animals.

Drs. Payne, Washbourne, Manson and McLeod also took part in the discussion.

PLAGUE IN INDIA.

WITH reference to the plague in India, *The British Medical Journal* of December 26th says:—"The real crux of scientific discussion centres round the Calcutta cases. The *pestis minor* or *pestis ambulans*, as it is termed, evidently prevails in that city, and the experts and others are much perplexed thereby. One man finds the bacillus in "plague" cases only to have it denied by others.

"The idiopathic buboes—*bubon d'emblée*—which for years has engaged the attention of medical men in the Far East, from the Straits Settlements and Singapore to Hongkong, seems to have reached the latitude of Calcutta. The Shropshire Regiment, moreover, the very regiment which was lying in Hongkong during the

plague epidemic in 1894, and from which some hundreds of men volunteered to do "plague work" in Hongkong, is now in Calcutta. They are showing non-venereal buboes in extraordinary numbers, and their ailment is viewed with suspicion by some, and classed with others as ordinary occurrences of buboes. But we fail to recall any such disease in our text-books, and can only join in the view that these are cases of mild plague or a separate disease.

"As will be seen from the report in another column, Dr. Cantlie, in his paper on the 'Spread of Plague' read before the Epidemiological Society on December 16th, 1896, discussed this aspect of the subject. He stated that idiopathic bubo—*bubon d'emblée*—has been prevalent on the China Coast for several years, so much so that active correspondence went on between the Hongkong and Singapore Branches of the British Medical Association on this very subject as to their nature. The subsequent outbreak of plague in China raised the question whether these idiopathic buboes should be included under the heading *pestis minor* or whether they were a separate and hitherto unrecorded disease.

"The Calcutta observers are evidently divided into two camps: the exponents of the bacillus declare that a bacillus identical in microscopic appearance, but differing in toxic powers, is met with in these cases of idiopathic bubo and in those of the ambulatory form of plague which are at the present moment met with in Calcutta. Their opponents reject the bacillus altogether, denying that it is in any way allied to the true plague bacillus. The issue of the investigation will be awaited with interest."

THE PLAGUE.

LETTER FROM THE MEDICAL BOARD.

THE following letter, dated Calcutta, the 20th January, has been addressed by Mr. Banks Gwyther, Secretary to the Medical Board, to the Secretary to the Government of Bengal, Municipal Department:—

I am directed by the Medical Board to report that it has come to their notice that in consequence of the spread of plague in and near Bombay and the increasing probability of the disease reaching Calcutta, serious anxiety is felt here by the inhabitants and by those who are interested in the trade of the town. On the 30th November last the Board made certain specific recommendations for the cleaning of the city from the accumulation of filth reported by the Sanitary Officers. Their object in doing so was to save time as they felt that, directly plague broke out, labour would desert the city, so that whatever was to be done must be done quickly. They have, however, no means of knowing what action has been taken by the Commissioners in the

matter, and, so far as their information goes, they doubt whether the extra establishment employed by the Corporation, which is believed to consist of one superintendent, two inspectors, 200 coolies and 60 small carts, is nearly sufficient for the purpose. In these circumstances I am directed to request that the Commissioners may be called upon to state at once what they have actually done to prevent an outbreak of plague in the town, and that if the measures adopted by them are found to be inadequate they may be ordered under section 38 of Act II (B. C.) of 1888, to appoint a special staff large enough to deal at once and effectively with the masses of filth and refuse of various kinds which have accumulated in many parts of Calcutta.

The Medical Board observe that, at the general meeting of the Commissioners held yesterday, the Chairman stated that 600 of the worst houses in Bara Bazar and Jorabagan had been cleansed and disinfected, but that a second cleansing was necessary, and those wards would have to be done over again. For these two wards alone, 200 extra coolies and 40 carts would be required. He added that similar deposits of filth existed in Coolootollah, Jorasanko, Burtola, Entally, Taltola and Puddupukur. If this is a complete account of the action taken by the Corporation to cleanse the town of Calcutta and guard against a visitation of the plague, the Board are constrained to remark that surprisingly little has been done. So long ago as the 30th September last when plague first appeared in Bombay, the Commissioners were warned by the Government that they should "take every reasonable precaution to prevent any outbreak of the disease in Calcutta." Nearly four months have now passed, and although during that time the Commissioners have been informed of the existence of vast accumulations of filth, and of the prevalence of conditions specially favourable to an outbreak of plague, the staff appointed by them to remove the cause of this great public danger is, on their own showing, only sufficient to deal—and that, it would seem, imperfectly—with two out of the eight wards in which deposits of filth exist. In six wards nothing at all appears to have been done; in two, what has been done will have to be done over again. For reasons which the Lieutenant-Governor is aware of, the Board are not in a position to say who is responsible for the patent inadequacy of the measures said to have been adopted to guard against the most formidable calamity that can befall the inhabitants and the commerce of this city. But if the facts are as stated, they venture to urge that the time has now come for Government to intervene, either by issuing an order under section 38 of the Municipal Act, or if that procedure is thought likely to lend itself to further delays, by passing a Special Act to meet the present emergency.

GOVERNMENT AND THE CORPORATION.

THE following letter has been addressed by the Hon. Mr. H. H. Risley, C. I. E., Secretary to the Government of Bengal, to the Chairman of the Corporation of Calcutta, the 23rd January 1897:—

SIR,—In continuation of my letter No. 323, Medical, dated the 21st January 1897, I am directed to forward for the information of the Commissioners the accompanying copy of a letter from the Medical Board, and, with reference thereto, to request that it may be distinctly stated whether it is the case that the only establishment hitherto sanctioned by the Commissioners for the purpose of removing accumulations of filth in the town, brought to notice by the Sanitary Officers is that detailed in Dr. Simpson's note, dated the 1st October 1896, which was written before the Sanitary Officers had made their survey of the town.

It appears from the note that this establishment, the strength of which for cleansing purposes is correctly stated by the Medical Board was proposed by the Health Officer with reference to the requirements of a single ward, and that the intention was that after cleansing that ward thoroughly the whole of the special staff should "pass on to take up another ward and deal with it in the same way." I am to point out that this procedure, which seems to have been proposed without full knowledge of the extent to which filth had accumulated in no less than eight wards is wholly inadequate to meet the present occasion. It would prolong indefinitely the process of cleansing and would intensify rather than allay the general feeling of alarm on which the Medical Board lay stress. The Corporation has now to deal with a special emergency which calls for prompt and vigorous action. The plague has spread rapidly during the last four months, and shows no signs of abating. It is the duty of the Commissioners to take effective measures to prevent an outbreak in Calcutta, and the Lieutenant-Governor insists that a temporary establishment shall at once be appointed sufficient under proper supervision to cleanse the entire polluted area as quickly as possible. I am to request that the action taken on this letter may be reported in full at a very early date. It will be for the Commissioners to consider hereafter whether any portion of the cost of the establishment can be recovered from the owners of the premises which are cleansed.

THE CASE FOR THE CORPORATION.

THE following letter was addressed by Mr. H. C. Williams, Chairman of the Corporation of Calcutta, to the Secretary to the Government of Bengal:—

SIR,—In acknowledging the receipt of your letters No. 323 of the 21st January and No. 365

of the 23rd, I have the honour to forward the copy of a letter from Dr. Simpson, the Health Officer, on the subjects alluded to therein. There seems to be some misapprehension on the part of Government as regards the sanction of any extra establishment by the Commissioners, because for the reasons pointed out by Dr. Simpson no application for extra temporary establishment for cleansing the town was made until the 21st, and when the matter came before the General Committee on the 22nd, the first day it could be brought, that committee although then refusing, on what I consider good grounds, to sanction the establishment asked for, gave a grant of Rs. 30,000 towards a temporary establishment for cleansing the town. In consequence of this sanction orders have been issued to the Superintendent-in-Chief to entertain a staff amounting to 1,300 coolies, including the necessary sweepers and 283 carts with the necessary superintendence, which will be distributed in nine gangs over different parts of the city.

With reference to the Government of India's letter No. 46 of the 19th January forwarded with your letter No. 323, I would venture to remark that although it is possibly within the power of the Municipality to prevent the spread of the plague when it reaches Calcutta, the Commissioners are powerless as regards its introduction into the city, and I would bring to your notice that it is a most important question as to whether the Government of India and the local Governments should not do more to prevent the introduction of the disease than has been hitherto done. Possibly more has been done than is generally known, but the fact remains that even still passengers are daily arriving from Bombay, and that although medical examinations may take place on the way, it is believed that they are not in all cases thorough, and that passengers can avoid them by breaking their journeys and coming on by different trains. It will be observed that Dr. Simpson states that at present there is only one Hospital Assistant at Howrah and none at Sealdah, although passengers from Bombay can easily come into Calcutta by that route. I would, therefore, suggest that a thorough quarantine be established as far as possible, as from the newspapers it appears that wherever plague has appeared it has been distinctly traced to refugees from Bombay.

In my letter No. 6055 of the 11th instant I have already pointed out that, although it is perhaps right to stop pilgrims proceeding from Bombay or Kurrachi, yet such a prohibition must lead to more pilgrims going *via* Calcutta, and would again suggest that if the prohibition cannot extend to Calcutta, most stringent measures should be taken to prevent any pilgrims entering the city.

As regards the special establishment for cleansing the Burra Bazar, it has been found that the work to be done there is considerably more than

was originally anticipated, and accordingly another gang of 200 coolies will be allotted to Wards 5 and 7 out of the 1,300 men now sanctioned.

Some of the cost of the establishment is being recovered from the owners of the premises now being cleansed, but it is feared that a very large amount will be irrecoverable.

DR. SIMPSON'S NOTE.

Dr. Simpson's letter to the Chairman of the Corporation is dated January 26th, and is as follows:—

In reply to the letter of the Government of Bengal, dated 23rd January, enclosing letter from the Medical Board, I have the honour to state that Rs. 30,000 was recently sanctioned by the Commissioners for the cleansing of the city over and above that applied for by me in my Note dated 1st October. The extra establishment consists of 1,300 men, 283 carts, 12 Sub-Inspectors and one Superintendent.

With reference to the report of the sanitary officers referred to in the letter it should be remembered that the inspections of these officers were made at a time when the extra establishment recommended by me had recently commenced work and immediately after a Superintendent-in-Chief had been appointed for the supervision of the cleansing of the town. Since then a large amount of filth has been removed from the town, and a very large number of filthy houses have been cleansed and limewashed in different parts of the town.

After the appointment of the new staff in addition to the existing establishment it was necessary to see how far they were capable of dealing with the work, and as soon as the Superintendent-in-Chief was satisfied that he required an extra establishment and had determined after careful consideration what that establishment should consist of, no time was lost in placing the matter before the Chairman. And on seeing that there would be a possibility of delay in obtaining sanction for the full staff required from the Commissioners I urged on 13th of January the immediate entertainment of a staff based on Dr. Banks' requisition, and in addition to this applied for extra supervision. As I have mentioned Rs. 30,000 have been sanctioned for an emergent cleansing staff.

It should be stated that there is some misconception on the part of the Medical Board as to the extent of accumulated filth in the city. There are no wards like Burra Bazar and Jora Bagan as pointed out in my Note of October 1st, and although only 600 houses have been cleansed and limewashed in these two wards this does not mean that they are the only houses which have been attended to either in those wards or in the town. Precisely similar precautions have been taken by a great many house-owners themselves. Further, although the eight wards mentioned are

undoubtedly dirty, there is not the accumulation of filth as found in the two wards mentioned above.

There is one point which in my opinion the Medical Board have not adequately realised, namely, that there are other precautionary measures against plague, besides cleansing. The importance of cleanliness is undoubted, but recent experience in Bombay—an experience which is only confirmatory of that derived in other cases of infectious disease has shown that cleansing *per se* is not all that is necessary to safeguard a place against plague, or cut short an epidemic when it has broken out. In other words cleansing is only one of several precautionary measures which must be taken against the epidemic, and in order to prevent the disease effecting an entrance into a locality other measures are to be adopted, or mere cleansing will prove of little value.

It will be seen from the following precautions recommended and taken by me that every endeavour has been made to guard the city against invasion as a preliminary measure, and that attention has been directed to the weak points by which plague is likely to effect an entrance and lodgement in Calcutta. The recommendations made by me since September last are as follows:—

(1) Medical examination of passengers from Bombay to Calcutta, and precautions to be taken by Railway authorities against the spread of disease by work people and goods. These recommendations were sent to Government and the Railway authorities by the Corporation. The safety of the city in this direction depends largely upon the action taken on these recommendations, and whether the precautionary measures are efficiently carried out and in proportion to the urgency of the danger. I may state that I have recently learned that there is only a Campbell School Civil Hospital Assistant at the Howrah Station and none at Sealdah, and though I know that medical inspections are made at certain intermediate stations I would take this opportunity of stating that the time has arrived for the authorities to take very stringent and more adequate precautions on the lines of railway and on a scale commensurate with the gravity of the danger.

(2) Quarantine in the port.

(3) Increasing the number of medical inspectors and the formation of sanitary circles which has been carried out.

(4) The erection of a plague hospital and the selection and securing of another site for a second plague hospital.

(5) Provision for ambulances. Two have been provided.

(6) That the provisions of Sections 321 and 334 of the Municipal Act should be enforced—

(a) The application of power conferred for the isolation of the sick.

(b) The application of power for cleansing and disinfecting houses.

(c) For preventing rag-picking in the streets and power to destroy rags in rag-pickers' houses or rag-stores.

(d) The power to prohibit and destroy infected articles coming from Bombay.

(e) Power to enter and carry out sanitary measures during the day or night.

(7) The selection of sites for special burning and burial-grounds.

(8) Advertisements inserted in the daily papers—

(a) To advise householders what to do to exclude plague. 1,00,000 copies of these instructions were issued to householders in Urdu, Bengali, Hindi and English, and another 50,000 are being printed for the same purpose.

(b) Advertisements giving the chief symptoms of plague were published and addressed to all medical practitioners, and similar papers were sent to the East Indian Railway medical men.

(9) Suggestions have been made to the Postal and Telegraph Departments to prevent the conveyance of infection by disinfecting at the places of despatch, letters, parcels, and telegraphic copies which may be sent to Calcutta from infected districts.

(10) A communication was sent to the Local Government advising the control of the traffic of pilgrims to Mecca, and to prevent them from lodging or staying even for a few hours in Calcutta or Howrah, but to arrange to conduct them direct from the station to the steamers.

(11) The sites for the temporary erection of encampment, for healthy people from infected houses are being considered.

(12) The recommendation for the appointment of a special Health Officer for Howrah and the adoption there of the same precautionary measures as in Calcutta.

(13) It has been recently suggested that the medical inspectors should be doubled in number. Their duties consist in visiting crowded lodging houses, taking notes of recent arrivals, and reporting any suspicious case of sickness in town.

(14) In addition to the above (a) several cases of illness which in my opinion and in that of other medical men were cases of plague, were immediately isolated, and the infected houses and articles thoroughly disinfected.

(b) Two grain depôts in which rats were sick with bubonic swellings and dying in large numbers were thoroughly cleansed and disinfected, and the rats were destroyed. One of these depôts has been closed, and the inhabitants removed, and the other was disinfected, and an application has been made to the Magistrate to close it.

I have gone rather fully into what has been done because, while great prominence is given to measures for cleansing the town, it does not seem to have been realised that a careful watch has been

kept over the city, and that a great deal has been done to prevent the entrance and lodgment of the plague. I believe these measures have up to now proved effectual in keeping this city free from plague.

ON NON-VENEREAL BUBO.

THE following interesting letter appears in the *British Medical Journal* of January 9th, 1897.

The publication in the *British Medical Journal* of September 26th, 1896, of a paper entitled "On Non-Veneréal Bubo," by Fleet-Surgeon C. G. Godding, R.N., induces me to forward the following remarks on apparently similar cases which have been under my observation for some two years past in the Presidency District of Bengal.

On examining the medical history sheets of the regiment quartered at Fort William, I find that, up to the end of September last, they record 79 admissions for inflammation of lymph glands; of these, after rejecting such cases as looked suspiciously like being, or were noted in the "remarks" as being, due to venereal disease and irritation, 42 cases remained which were variously ascribed to the following causes: Climate, constitutional, malarial, uncertain, and unknown.

Of the battery stationed in the same fort for two years there were (up to the end of September) 11 men who have had inflammation of lymph glands, of which 7 cases show origin "unknown;" of these, 3 occurred in this district, 2 in Allahabad (their previous station), and 2 in England.

Of the 42 cases in the regiment noted above, 13 occurred in Hongkong, 25 in Calcutta, 2 in Malta, and 2 in England. The preponderance of cases in Calcutta is, of course, due to the fact that the regiment had been here one year and nine months, and consequently many of the men who had had a similar complaint in Hongkong, and more still of those who had had it in Malta had left.

There is no doubt that some of these cases could be traced, if a careful and searching investigation were made, to a previous attack of boils, the boils being probably small, and the patients not reporting sick until the trouble in the groin interfered with locomotion. Another cause, which is not noted in any of these cases, and a fairly frequent cause in my experience, is "Dhobi's itch," which is very severe out here, specially when situated between the scrotum and the thigh. Still, when every possible source of local irritation has been eliminated, there remain cases for which no other origin can be assigned but malaria or sepsis from intestinal glands.

These more obscure cases are usually preceded by fever, sometimes of prolonged duration (considered frequently to be remittent fever); the

patients are cachectic in many cases, and have had previous admissions for malarial fever; the buboes sometimes come on while the patients are under treatment for "climatic" fever, and even dysentery. I examined the blood of 5 or 6 of these cases for the plasmodium but without success. As the buboes invariably occurred in the inguinal glands, and as the patients nearly always had irregular bowels (the temperature even in some cases being sent up by the administration of laxatives), with dyspeptic symptoms, and sometimes dysentery, the possibility of their being due to secondary infection from the mesenteric lymph glands then occurred to me. Considering the possibilities of infection along a long line of intestine, which need not necessarily be ulcerated, but may be sufficiently disordered in some way to allow of bacteria finding their way through to the mesenteric or lumbar glands, then to the inguinal glands, such an origin appears to me extremely probable, especially in tropical climates, where bowel troubles, often very obscure, are so frequently suffered from.

CALCUTTA.

B. M. SKINNER,
Surgeon-Major, A. M. S.

LONDON LETTER.

"A SHORT History of Aryan Medical Science," by H. H. Sir Bhagvat Singhjee, K.C.I.E., M.D., D.C.L., LL.D., F.R.C.P.E., Thakore Sahib of Gondal, is the title of a book recently published by Messrs. Macmillan & Co., which has excited a good deal of interest. It has been reviewed extensively and favourably and has constituted the foundation of not a few special articles and leaders. As an exposition of the ancient medical science of the Hindus, it is excellent. It reveals a system wonderfully elaborated, gives evidence of immense industry and shrewd observation, coupled, unfortunately, with a lively use of the imagination and an abounding sense of the supernatural. This it is which imparts an aspect of unreality to the whole structure, and makes it an object of admiration or veneration according to the standpoint of the contemplator rather than of cultivation or use. The three humours which underlie the physiology, pathology and therapeutics of the system are pigments of the fancy, pure inventions and fictions, and it is not surprising that in every part and development of the scheme the results of sound perception are vitiated by the too free exercise of unsound conception. It is the old story of Babel—the attempt to scale the heaven of science by constructing a complete system. The confusing clamour of irreconcilable facts will brook no denial, and the completion of the tower becomes impossible, nay it crumbles and falls and nothing remains but a history of failure to warn against any repetition of similar folly. I could easily

specify other medical towers than the Aryan constructed on unsound principles and with faulty materials, ambitious in design, imposing in inception which the rude logic of facts has demolished; and there are not a few such in our own day inevitably fated for destruction and ruin. The moral to be drawn from this building of pseudo-scientific towers is that humility and progress are the real attributes of sound inquiry, not arrogance and finality. In reading the Thakore's book, which I have done very carefully, there is one thing which strikes me as very remarkable, namely, the absence of any germ of epidemiology and of the affiliated subject of the hygiene of communities. Disease and its prevention and cure are exclusively treated as they concern the individual. The elaboration of diseases and remedies is most minute, and the rules of personal hygiene most detailed; but the existence, causation and prevention of epidemics are not dealt with. Nor are those hygienic regulations which are necessary for the common as well as the individual welfare. It is probably from this cause that the great anomaly exists which strikes a very casual observer in India, namely, that while personal hygiene is the subject of immense care and labour, and domestic hygiene is also the subject of praiseworthy attention, the hygiene of the village or town is neglected, and concerted action to secure a pure water-supply and remove rubbish and filth is conspicuous by its absence. Miss Florence Nightingale has, in the December number of *India*, advocated that this forgotten phase of national education should be supplied by means of "health missionaries" delivering lectures in villages and orally instructing the villagers as regards the sanitary duties and obligations of associated life. Looking to the immense numbers of villages in India, the scheme is probably a larger and more expensive one than Miss Nightingale contemplates, but apart from this difficulty I doubt very much whether the proposal is a wise one. It would lead to widespread corruption and oppression. The Indian peasant does not regard with favour the *safai-wallah*, even when he is a Government, municipal or village servant, engaged in practically promoting cleanliness as a part of the business of administration. The missionary would, even if he did not take advantages of his position for purposes of personal profit, be counted as an irresponsible annoyance and treated accordingly. By all means let the cardinal facts and laws of healthy existence be taught in schools, but example in the shape of the sweeper and his cart is likely to be more potent with the Indian villager than precept in the guise of the health missionary with his wife and magic lantern!

The Government of South Africa has engaged the services of Professor Koeh for the purpose of investigating the bacteriology of rinderpest and

perhaps also of the tsetse fly plague. This circumstance has given rise to some heart-searching in this country. Of the necessity of the inquiry no doubt is entertained. The rinderpest has caused immense loss, and probably been the chief cause of the Matabele revolt which has only recently been suppressed. But why go to Germany for a man to conduct this investigation? Are there not men in England or in India thoroughly competent to undertake this duty in an English colony? The report of the English Cattle Plague Commission was for its day a marvel of painstaking inquiry and careful research. The Indian Cattle Plague Commission of 1869-70 was equally industrious and succeeded in placing on record an immense mass of information regarding cattle plagues in Hindustan, the most common and fatal of which was clearly proved to be rinderpest. Bacteriology has since then arisen, but though Koch has been a pioneer and leader in the cultivation of this science, English and Indian workers have not lagged behind, and Dr. Simpson's researches into this very matter seem already to have led to the discovery of the bacillus of rinderpest. In science, however, questions of nationality have no *locus standi*. That Koch is eminently, I had almost written pre-eminently, fitted to undertake the investigation of these cattle plagues in South Africa is beyond question; and we shall await with much interest and hope the results of his work. Meantime, there is no reason why similar work should not be continued in India, and it is to be hoped that Dr. Simpson will continue his observations and experiments which give promise of throwing much light on the pathology and inter-relations of the variolous diseases of men and kine.

Professor Notter of Netley has been elected President of the Epidemiological Society of London. This is a well earned compliment to the man and a graceful tribute to his service. In a very interesting inaugural address, he discoursed upon those conditions of soil which seemed to favour the generation and propagation of cholera and yellow fever. Seeing, however, that even in places where these diseases prevail endemically, every known condition of soil may and does exist without any manifestation of disease, the rôle of soil in causation must logically be considered adjuvant and secondary. So with filth and decomposition of organic material, it is quite certain that these are incapable *per se* of giving origin to these specific maladies. Still it is equally certain that their presence favours the special processes and development which give rise to the limited and fitful visitations of cholera and yellow fever just as common putrefaction in a wound constitutes a favourable condition of entry and growth of septic organisms.

10th December 1896.

Current Medical Literature.

MEDICINE.

ANHELONIUM LEWINII, OR MESCAL BUTTON. (By S. WEIR MITCHELL, M.D. *British Medical Journal*).—In the March, 1896, number of the *Indian Medical Gazette*, I drew attention to the wonderful effects of this drug as described by Dr. Prentiss in *The Therapeutic Gazette*. Dr. Weir Mitchell has been experimenting on himself with extract of mescal buttons, and the gorgeous visual sensations he experienced are graphically depicted by him in the *British Medical Journal* of the 5th December 1896. He thinks that the mescal colour-visions are in some degree similar to what has been observed in some ophthalmic megrims. At present no obvious therapeutic uses have been discovered for this vision-breeding drug; but Dr. Weir Mitchell fears that the "mescal habit" may become established when the drug becomes more accessible to the public.

GLENARD'S DISEASE, OR ENTEROPTOSIS. (By J. GARDNER M.B., C.M. *The Medical Chronicle*).—This disorder is better known, and has been chiefly worked out, by continental physicians. It occurs chiefly amongst women, and is caused by tight-lacing, pregnancy, abdominal tumours, or ascites. Vertical displacement of the stomach, in which the stomach describes an arc of a circle with its cardiac end as centre, and the pylorus moves downwards and to the left, is usually caused by undue pressure from the corset. Enteroptosis, or gastropptosis, is another effect of tight-lacing. In it the stomach is lowered *en bloc*; the left lobe of the liver pushes the lesser curvature downwards and to the left, often bending it to a sharp angle towards the fundus. The right lobe of the liver, in its descent, displaces the pylorus and duodenum downwards and to the left. The transverse colon is also displaced, and may even be V-shaped, with the stomach contained between the two arms of the V. The abdominal muscles are weakened, so that they do not sufficiently support the viscera. There is an absorption of fat in the abdominal parietes and omentum. In some cases the right kidney is also displaced by the downward pressure of the liver.

"The symptoms are: pain setting in some time after food, vomiting, marked constipation, giving way occasionally to attacks of diarrhoea, in which hard masses of faeces are passed covered with mucus, weight over the pubes, dragging in the epigastrium and loins, and a sensation of pressure over the bladder. In addition to these, however, many other symptoms may be present, such as giddiness, feeling of emptiness in the head, flushing, various sensations in the bowels, and coldness of the hands and feet. Attacks of colic are not uncommon." * * * The weight and

dragging are always easier when the patient is sitting than when standing, walking aggravates them, and complete relief is obtained only in the dorsal decubitus. * * * The first effect of the displacement is to prevent the normal dilatation of the stomach when food is taken, and shortly too little food is taken. * * * The patient soon finds that the less she eats the easier she is, but the semi-starvation leads to further weakening of the abdominal muscles and absorption of fat and to further displacement downwards of the stomach, till, finally, the weight of the food pulling the stretched and narrowed first part of the duodenum makes a sharp angle between it and the second part, which is immovably fixed to the spine, and prevents the passage of the digested food. This causes severe pain, which the patient finds is speedily relieved when she lies down, the weight being taken off the duodenum, and the food allowed to pass."

SPARTEINE SULPHATE AND CHLOROFORM. (By G. G. COTTAM, M.D. *The Therapeutic Gazette*).—Dr. Cottam prefers sparteine sulphate to digitalis, alcohol, or strychnine as a safe, efficient, and prompt cardiac stimulant in chloroform narcosis, especially when depression is likely to occur from the operation being prolonged or the patient debilitated. He injects one-tenth of a grain hypodermically ten minutes before the anæsthesia is commenced. If the operation is protracted, one-fifteenth of a grain is subsequently administered.

C. Beville gives one-fifth of a grain by the mouth thirty minutes before the chloroform.

Langlois and Maurange give three or four centigrammes of sparteine sulphate and one centigramme of morphine hypodermically fifteen minutes prior to the anæsthesia.

URÆMIC DYSPNŒA. (By NESTOR TIRARD, M.D. *The Practitioner*).—Five forms of dyspnœa have been described as occurring in uræmia, viz.:—(1) Continuous; (2) paroxysmal; (3) both types alternating; (4) laryngeal; (5) Cheyne Stokes' breathing.

The pathology of uræmic dyspnœa has been variously explained, e.g. (1) contraction of the muscles of the smaller bronchi; (2) contraction of minute arterial twigs belonging to the coronary arteries or to the pulmonary vessels; (3) œdema of the lung, or accumulation of fluid in the pleural sac; (4) anæmia; (5) cardiac debility and dilatation; (6) the influence of uræmic blood upon the terminations of the vagus nerve, or irritation of the motor fibres which supply the bronchial muscles; (7) direct irritation of the respiratory centre in the medulla by waste products in the blood.

Routine treatment usually consists of warm pack or steaming, diaphoretics, diuretics, hydragogue purgatives, dry-cupping or bleeding. The action of the nitrites (nitrite of amyl, nitrite of sodium, ethyl nitrite, cobalto-nitrite of potas-

sium, nitroglycerine) has been vaunted by some; but Dr. Tirard has been disappointed in their use. He has got better results with ozonic ether, or oxygen, and from the diuretic action of digitalis, caffeine or diuretin.

CHLORIDE OF AMMONIUM IN DELIRIUM TREMENS. (By G. G. COTTAM, M.D. *Medicine*).—Many dipsomaniaes also indulge in the use of morphine, chloral hydrate, bromide of potassium, etc.; hence it comes that these drugs frequently fail in the treatment of delirium tremens.

Dr. Cottam states that "chloride of ammonium, in moderate doses, from 10 to 30 grains, will effectually overcome ordinary alcoholic intoxication in a short time." He has tested its use in one severe case of delirium tremens with gratifying results. He was called to attend on a labourer, who had been a habitual drunkard for ten years, and who was suffering from his third attack of delirium tremens. The patient was accustomed to the use of morphine.

Dr. Cottam first injected one grain of morphine hypodermically, without producing the slightest effect. "Several hours after the administration of morphine, and after the symptoms had all become aggravated, he was given one drachm of chloride of ammonium. This was promptly vomited. After waiting a short time another was given, which was retained. It acted quickly and favourably. In fifteen minutes the hallucinations of snakes and lizards had disappeared, and he had become quite rational. In forty minutes he was asleep, and it was not thought necessary to continue the drug."

ELECTRO-DIAGNOSIS AND ELECTRO-THERAPEUTICS SIMPLIFIED. (By H. T. PATRICK, M.D. *Medicine*).—"What is reaction of degeneration, and how may it be recognized? In the first place, we may neglect all statements as to the direction of the current. In the next place, we may forget all differences between direct and indirect excitation. The former alone is necessary. Lastly, we need commit to memory no details as to polar action—no confusing formulæ regarding cathodal closure contraction and anodal opening contraction, etc. They are not only unnecessary, but are unreliable guides as well. As a matter of fact, although most normal muscle responds better to the negative pole (C. C. C.) and most badly degenerated muscle to the positive pole (A. C. C.), there are many exceptions to both physiological and pathological law.

We have but two facts to remember. First, in reaction of degeneration, contraction to the faradic current is greatly diminished or lost; to this there is a possible exception in that, if the lesion be very slight or transient, the diminution in faradic excitability may be so slight as to be inappreciable. Second, the contraction to the galvanic current is *slow*.

The normal response is by a quick contraction or jerk. The deliberate contraction of degenerated muscle to galvanic stimulation has been called "vermicular" and likened to the normal contraction of unstriated muscle. It is not to be inferred that it is as slow as intestinal peristalsis, but it is so distinctly slower than the "lightning-like" flash of contraction produced in healthy muscle as to be unmistakable having been once seen."

SALOL IN DIARRHŒA. (*The Therapeutic Gazette*).—Dr. Russell urges "the use of salol and bismuth to the exclusion of opium," except in very severe cases of diarrhœa. He prescribes salol $\mathfrak{z}\text{i}$, Bismuthi subnitrat is $\mathfrak{z}\text{ii}$, mist. cretæ ad $\mathfrak{z}\text{iii}$, giving $\mathfrak{z}\text{ii}$ doses every hour or two until relief is obtained. He has found it of great use in diarrhœa due to dietetic errors, in typhoid fever, and in tuberculosis.

The Editor draws attention to the contra-indications to the use of salol. If given in large and frequent doses symptoms of carbolic acid poisoning may supervene, because salol contains forty per cent. of carbolic acid. Hesselbach has shown that salol is contra-indicated in persons with acute, subacute, or even chronic nephritis, owing to its irritant action upon the kidneys. Moreover, if diarrhœa occurring in a case of nephritis is too speedily checked, an increased strain may be thrown on the kidneys and may thus lead to uræmia.

D. M. MOIR, M.A., M.B.

OBSTETRICS AND GYNÆCOLOGY.

POST-PARTUM HÆMORRHAGE. (*Lancet*).—E. S. Bishop holds that compression of the aorta against the vertebral column is the only measure of primary importance. It should be applied by the ulnar side of the closed hand while the patient is in the dorsal position, and is to be maintained until hæmorrhage ceases. The uterine muscle is given time to rest and regain its contractility, and secondary measures such as massage of the fundus, ergot, &c., tending to stimulate the uterus to contraction, meet with response. The blood is also retained in the portions of the body which most require it. The point of compression should be changed occasionally in order to avoid prolonged pressure upon any portion of the sympathetic, and when pressure is ultimately removed it should be done very gradually, watching meanwhile the effect of the increased blood flow in the uterus. Brandy by the mouth or rectum, raising the foot of the bed, hot bottles around the body, and the removal of blood-clots or placental tissue are valuable measures after compression of the aorta has been begun. The use of ice, icewater and douching are condemned as unnecessarily submitting the patient to the danger of pneumonia;

the injection of perchloride of iron, as liable to prove ineffective; and tamponing the uterus as only of temporary value, the exhausted uterine muscle soon failing to contract, and its relaxation allowing fresh hæmorrhage which is concealed by the tampon.

INTRAVENOUS INJECTIONS OF SALINE SOLUTION IN PUERPERAL ECLAMPSIA.—The patient had already had twenty attacks of convulsions, with profound coma between, when the first intravenous injection was made. Five further attacks followed, and a second injection was made the next day, followed by complete cure with no more eclampsia. Three thousand grams were injected in all at 0.75 per cent.—Coenin the *Ann. di Ostet. e Gin.*; *Gaz. Méd. de Liege*, October 15.

THE BEST METHOD OF SUTURE AFTER LAPAROTOMY. (*International Congress in Geneva*).—*La Torre*: A good abdominal scar depends upon three main factors: the location of the incision, the suture material and the method of suturing. *Bantock*: Bacteria take no part in the production of pus. They are result and not the cause of the condition. Suppuration of the abdominal wound or the suture tract does not originate from the introduction of germs or adult bacilli into the wound, but is the sequence of necrosed tissue in the wound and excessive tension of the sutures. The ordinary interrupted sutures suffices in most cases, but in very fat subjects it is advisable to close the peritoneal cavity with continuous sutures, while the rest of the wound is united by two layers of interrupted sutures. Silk is the best material for interrupted sutures, while for the continuous, catgut (not chromic acid gut) is preferred. *Byford*: Avoidance of wound infection and injury to the tissue during operation is of prime importance. A median incision is advised. First unite the peritoneum, next fascia and muscles, and finally the skin. Use interrupted sutures of silkworm gut. *Edebohl*: The resistance of the abdominal scar depends upon a broad surface of contact. Divide the fibrous covering of the recti and in the subsequent closure of the wound, the peritoneum is first united, next the two recti muscles are sutured together, and the suturing of the fascia and skin completes the operation. Use chromic acid catgut for all but skin sutures. *Wylie*: Hernia in the linea alba is frequently the result of abscesses, often caused by an excessive tension of the sutures. An exact suturing of the fascia is necessary; this should never be done by continuous sutures which would carry infection throughout the whole wound. *Pozzi* and *Engström* also lay great stress upon an accurate union of the same anatomical structures. *Coelho* considers deep silk sutures the best method, while *Lutzko* demonstrates a series of microscopical sections of the abdominal scar which show that deep sutures unite many structures not anatomically related to each other,

while a careful suturing of fascia to fascia and muscles to muscles, etc., hardly leaves a distinguishable scar.

NON-DRAINING GAUZE TAMPONS IN THE TREATMENT OF POST-PARTUM HÆMORRHAGE. (*Amer. Journal of Obstetrics*).—Although the recommendation of Dührssen to treat *post-partum* hæmorrhage by firmly tamponing the uterus and vagina with iodoform gauze has been followed by most excellent results, yet there are recorded a number of observations where the bleeding continued in spite of a most careful tamponade. Schaeffer ascribes this to the draining qualities of the gauze, and avoids it by impregnating the gauze with gutta-percha. Such gauze will not imbibe any fluid, but does retain it in its meshes thus favouring rapid blood coagulation. The material is soft, may be asepticized, and can also be impregnated with iodoform or ferripyryr, the latter augmenting its hæmostatic action.

THE FIRST OVIARTOMY.—According to "Memorials of the Faculty of Physicians and Surgeons of Glasgow," by Alexander Duncan, the first ovariectomy was performed by Mr. Robert Houston, of Glasgow, in 1701, or more than a hundred years before the operation of Ephraim McDowell, of Kentucky, who is generally credited with being the earliest ovariectomist.

The following account of Houston's operation is quoted by the *Medical Quarterly Journal* from Mr. Duncan's book. It was published in the thirty-third volume of the "Philosophical Transactions," London, 1733. Whether the claim that this was the first recorded ovariectomy is true or not, the account is interesting reading.

"August, 1701, I was in the country, with a patient, the Lady Anne Houston, wife to Sir John Houston, Baronet, in the Shire of Renfrow, ten miles from Glasgow, North Britain. This charitable lady pressed me with great earnestness to visit a tenant's wife, who lay bedridden of an uncommon disease, which no physician or surgeon who had seen her could give any name to, or account for. She informed me the ablest of that country had forsaken her, and declared her incurable, so that I could lose no reputation by the result of my endeavours.

"In order to oblige this worthy lady, and in compassion to the distress of a poor woman in so deplorable a condition, deserted and given over on all sides, I went, determined to do everything in my power for her relief. She was in the 58th year of her age; her name was Margaret Millar. She informed me that her midwife, in her last lying-in at 45 years old, having violently pulled away the burthen, she was so very sensibly affected by a pain, which then seized her in the left side, between the umbilicus and groin, that she scarce ever had been free from it after, but that it had troubled her more or less during thirteen years together; that for two years past she had been extremely uneasy, her belly grew

very large, and a difficulty of breathing increased continually upon her; insomuch that for the last six months, she had scarce breathed at all but with the utmost difficulty. That in all that space of time, having quite lost her appetite, she had scarce eat so much as would nourish a sucking child, and that for three months together she had now been forced to lie constantly on her back, not daring to move at all, to one side or other.

"This tumour was grown to so monstrous a bulk that it engrossed the whole left side, from the umbilicus to the pubes, and stretched the abdominal muscles to so unequal a degree that I don't remember ever to have seen the like in the whole course of my practice. It drew towards a point. Her being so long confined to lie continually on her back having grievously excoriated her, added much to her sufferings, which with want of rest and appetite, had wasted her to skin and bone, as the poor woman herself expressed it. Indeed she needed not to have told me so, my eyes were too faithful witnesses of her low and wretched condition.

"Scarce able to speak out, she told me that having heard much of my success, she had strong hopes of relief, provided I would try at least and do something in pity of her affliction. I answered her that I was willing but afraid, in her low state, she would not have strength to undergo a large incision; that in order effectually to relieve her, I must be obliged to lay open a great part of her belly, and remove the cause of all that swelling; she seemed not frightened, but heard me without disorder, and as if inspired with sudden courage, pressed and urged me to the operation.

"I drew (I must confess) almost all my confidence from her unexpected resolution, so that without loss of time, I prepared what the place would allow, and with an imposthume lancet, laid open about an inch, but finding nothing issued, I enlarged it to two inches, and even then nothing came forth but a little thin yellowish serum, so I ventured to lay it open about two inches more. I was not a little startled, after so large an aperture, to find only a glutinous substance bung up the orifice. All my difficulty was to remove it; I tried my probe, I endeavoured with my fingers, but all was in vain; it was so slippery that it eluded every touch, and the strongest hold I could take.

"I wanted, in this place, almost everything necessary, but bethought myself of a very odd instrument, yet as good as the best in its consequence, because it answered the end proposed. I took a strong fir-splinter, such as the poor in that country ordinarily used to burn instead of candles; I wrapt about the end of this splinter some loose lint, and thrust it into the wound, and by turning and winding it, I drew out some two yards in length of a substance thicker than

any jelly, or rather like glue that's fresh made and hung out to dry; the breadth of it was above ten inches; this was followed by nine full quarts of such matter as I have met with in steatomatous and atheromatous tumours, with several hydatides of various sizes, containing a yellowish serum, the least of them bigger than an orange, with several large pieces of membranes, which seemed to be parts of the distended ovary. Then I squeezed out all I could, and stitched up the wound in three places, almost equi-distant; I was obliged to make use of Lucatellus's balsam, which was made by her lady for the use of the poor; with this balsam I covered a pledget the whole length of the wound, and over that laid several compresses, dipped in warm French brandy, and because that I judged that the parts might have lost their spring by so vast and so long distention, I dipt in the same brandy a large napkin four times folded, and applied it over all the dressings, and within a couple of strong towels which were also dipt, I swathed her round the body, and then gave her about four ounces of the following mixture which I had from her lady:—

"R	Aq. Menthe	...	...	...	lb. fs.
	Aq. Cinnamon fert.	...	...	...	lb. ifs.
	Syr. Diacodii	...	...	...	3vi. M.

"The cinnamon water was drawn off from Canary and the best cinnamon; indeed it was the finest and most fragrant cinnamon water I ever tasted. Of this mixture I ordered her two or three spoonfuls four times a day.

"Next morning I found her in a breathing sweat, and she informed me, with great tokens of joy, that she had not slept so much, nor found herself so well refreshed, at any time for three months past. I carefully attended her once every day, and as constantly dressed her wound in the same manner as above for about eight days together. I kept in the lower part of the wound a small tent, which discharged some serosities at every dressing for four or five days. But business calling me elsewhere, I left her, having first instructed her two daughters (both women, who carefully attended her) how to dress her wound, and told them what diet I thought most proper, enjoining them strictly to observe what I ordered.

"Her chief food was strong broth made of an old cock, in each porringer of which was one spoonful of the lady's cinnamon water; this was repeated four times a day, and gave her new life and sprits.

"After three weeks' absence I called at her house, and finding it shut up, was a little surprised, but had not gone far before I was much more surprised, when I found her sitting wrapt up in blankets, giving directions to some labourers who were cutting down her corn.

"She amended apace to the admiration of everybody thereabouts, recovered surprisingly, and lived in perfect health from that time, which was in August, 1701, till October, 1714, when she died in ten days' sickness."

Some pathological observations follow, and the paper finishes with a bibliography of ovarian tumours.

Honsten's case of ovariectomy is notable, not only as being the first recorded, but for being performed in the absence of proper instruments, and under apparently ludicrously unfavourable conditions; yet with a success which could not have been surpassed by a Keith or a Spencer Wells, with all modern appliances and means, aseptic and antiseptic to boot.

It is noteworthy that in this account no mention is made of the method of dealing with the pedicle, or of the time of removing the stitches from the abdominal wound.

KEDARNATH DAS, M.D.

Vital Statistics & Sanitation.

NOTE ON THE CASES REPORTED AS PLAGUE IN CALCUTTA.

BY THE CALCUTTA MEDICAL BOARD.

(Continued from page 36.)

In the case of Bipin Behari Dutt, whose clinical symptoms we have already discussed, a specimen of blood and some blood-cultures were sent to Dr. Cunningham, together with portions of a rat into which 2 cubic centimetres of a culture of blood had been injected, causing its death after thirty-one hours. The specimen of blood and the cultures showed, as has been mentioned above, unequivocal evidence of contamination by the presence of large bacilli, probably of a putrefactive character, which must have gained access to the preparation from outside.

This being so, it is clear that the smaller cocci and diplococci, which were also found, may equally have been the result of contamination. Nor does the death of the rat after inoculation afford any grounds for inferring the specific character of the germs contained in the culture, with which the animal was inoculated, for the bulk of actively decomposing fluid injected into the animal was relatively equivalent to over a pint in the case of an adult human being, and was quite sufficient to cause death by mere blood-poisoning. Moreover, had the enormous number of microscopic organisms introduced into the rat possessed the specific character attributed to them, the blood and tissues ought, after death, to have absolutely swarmed with the organisms, whereas in fact only a very scanty sprinkling of minute cocci and diplococci could be found in the specimens submitted to Dr. Cunningham.

Looking to the evidence as a whole, we have no hesitation in expressing our opinion that there is no evidence that any case of true bubonic plague has yet occurred in Calcutta; and that the cases which have been reported to us as plague were so described on the strength of an opinion as to the origin and character of certain microscopic organisms, which has not been confirmed by the results of an independent inquiry conducted by an expert of long experience in bacteriological research.

H. H. RISLEY, Secy. to Govt., Municipal and Medical Departments.

J. G. H. GLASS, Secy. to Govt., P. W. Dept.

G. C. ROSS, Insp.-Genl. of Civil Hospitals.

P. PLAYFAIR, Sheriff of Calcutta.

D. D. CUNNINGHAM,

Prof. of Physiology, Medical College.

H. J. DYSON, San'y. Commissioner, Bengal.

REPORTS ON SUSPECTED CASES OF PLAGUE.

Case No. I.—Reported Case of Plague at Howrah.

A Telegram was received by Mr. Risley on the 9th October, stating that a case of *Pestis Ambulans* had occurred in Howrah.

Telegram, dated 10th October 1896.

From—Darjeeling,	To—Calcutta.
From—Civil Hospitals,	
Bengal,	
	To—DR. SANDERS.

Please keep me regularly informed by wire regarding plague, and instruct all Medical Officers at Presidency to keep you informed.

Drs. Ross and Dyson left Darjeeling on Sunday, the 11th October, for Calcutta.

J. COTTA, a Eurasian, aged 16½ years, is a resident of Bombay, living at Byculla, at a distance of nearly 3 miles from Mandvi. On the 13th September he exposed himself to venereal infection; on the 17th he noticed local sores, and on the 19th that the glands of both groins were a little enlarged and slightly tender. He left Bombay on the 23rd in company with his sister and her children, arriving in Howrah on the 26th. He lived in a small house in Panchanuntollah in company with his sister and children.

On the 2nd October he went to the Howrah General Hospital under the assumed name of Maddox, and was treated by Mr. Mitchell, the apothecary, who diagnosed soft sores and prescribed "blackwash." At that time he had tender glands and slight fever. He returned on the 4th. The sores were better, but not quite healed; the buboes were painted with iodine; he said his fever had gone. On the 7th he again went to hospital, and was advised to become an in-patient for the further treatment of the buboes. He was directed to become a paying in-patient. He then went to the Medical College. About this time suspicion seems to have been roused about him.

S. B. Ghosal, Native Doctor to the East Indian Railway, who is at the Howrah General Hospital, states that on the 8th he was ordered by Dr. Tomes to go to Panchanuntollah to see Cotta at his house, and found him suffering from fever, with a temperature of 102°F., and swollen inguinal glands. He was visited the same evening by Drs. Tomes and Simpson; the latter aspirated blood from the finger and from the buboes for bacteriological examination. On the following day, Drs. Cobb, Tomes, and Simpson signed a certificate, stating that plague bacilli had been found in the blood of Cotta.

On the 11th, at the request of Dr. Ross, Inspector-General of Civil Hospitals, Cotta was examined by Dr. Sanders, who sent a telegram to Dr. Ross as follows:—

"Have seen Cotta; a typical case of syphilitic buboes; no fever; no cause for alarm."

On the 11th he was removed into the building provided by the Municipality for plague cases, his sister and a small boy accompanying him.

On the 12th he was examined by Drs. Ross and Dyson, who had just arrived from Darjeeling. Dr. Sanders also went with them.

They found him in the infectious hospital. It is situated on the road to Andul, and is a small cutcha-pucka house of two rooms with a square walled court-yard.

Both he and his sister were complaining bitterly of having been removed there. The place was full of flies, and the amount of ventilation scanty. On examination he was found to be in full possession of his senses—no headache, tongue clean, appetite good. He had inflamed glands in both groins, and stated that he had been put to considerable pain by being conveyed to the building in a gharry. His temperature was 102°F. This can easily be accounted for by the commencing suppuration in the buboes; the soft sores had completely healed. He had not received any clothes or food from Bombay since his arrival in Howrah. A consultation was held at once, and Dr. Sanders expressed his willingness to take the case into the Mayo Hospital for further treatment of the buboes. It was decided, however, to take him back at once to the infectious ward of the General Hospital at Howrah. This place was selected to avoid causing panic among the patients in the main body of the hospital.

He was visited again on the morning of the 13th by Drs. Ross, Sanders, Dyson, Vaughan, Tomes, and Mr. Maguire. He was very cheerful, tongue clean, eyes clear, no headache, pain less in the buboes. He expressed great satisfaction at the change of residence, and said he was all right. There were in the same room with him, his sister, a boy, and a female friend. The bubo on the left side showed slight deep fluctuation. It has been decided that when this is opened, some of the pus will be sent to Dr. Simpson for examination.

Dr. Ross deputed Dr. Leaby (who has had personal experience of plague in Bagdad) the same day to visit Cotta and report on his condition. He visited him at once and wrote as follows:—

"In accordance with your orders, I visited and made a careful examination of the man Cotta this afternoon at the Howrah Hospital. His condition bears no resemblance clinically to the cases of plague I saw in Bagdad. Of the two inguinal buboes, the left one is apparently undergoing suppurative changes, and to this I attributed his temperature 101° this afternoon. I have suggested the desirability of inoculating a spot on the abdominal wall with some of the pus from the bubo, when he opens it, with a view to finding out whether it will produce a soft chancre at the point of inoculation. We carefully examined Cotta's urine, with the following result:—Clear, amber coloured, acid in reaction, specific gravity 1,020, phosphates present, no albumen."

On the same day Drs. Ross, Sanders, Dyson, Tomes and Vaughan examined the house in which Cotta had lived previous to his removal to hospital. It is a small cutcha-pucka house, with cramped rooms, involving constant contact in its inhabitants. It had not been fumigated or disinfected or whitewashed up to that date. Cotta's sister and the other people living in it evinced

no fear of infection from living in it, and ridiculed the idea. In the same mohalla (Panchanuntollah) a case of plague had been reported that morning, and was immediately inspected by the doctors named above.

The patient was a Mussalman child, a little more than one year old. It had an enlarged gland in the right armpit, and a smaller one in the groin on the same side. Its temperature was 100°. It was said to have been ill for five days. The child did not appear to be suffering any great physical inconvenience, and its eyes were clear and bright, and the expression of the face cheerful. A local practitioner, who was standing by, stated "that it was by no means uncommon for people to get enlarged glands and fever in Howrah at the end of the rainy season."

Remarks.—Reviewing the case of Cotta, the only reason for supposing that he is suffering from plague (*Pestis ambulans*?) is the fact that plague bacilli have been found in his blood. I am not a skilled bacteriologist enough to decide whether they are the real bacilli or not, and would like the opinion of some other bacteriological expert, say Dr. Cunningham. On the other hand, we have a clear history of venereal infection with the enlargement and final suppuration which is so commonly a sequel. He has never suffered from any other symptoms resembling plague. His appetite has been good. His tongue is clean after nearly a month's illness; he has never suffered from frontal headache, delirium, high fever, hemorrhage, or epistaxis, injection of the conjunctiva; the enlarged glands have never caused severe pain; in fact, he has had none of the classical symptoms of plague. I am aware that there is a very mild form of plague called the "ambulatory form," in which the symptoms are of the slightest. This form of disease is generally held to be non-infectious.

With regard to the native practitioner's statement, that at certain times of the year people in Bengal suffer from enlarged glands, the remarks of Surgeon-Colonel May, A.M.S., in his Annual Return for 1895 possess great interest.

He says:—"There were 43 admissions for disease of the lymphatic system, of which 37 were for inflamed lymph glands of the groin. It would seem that there must be some climatic (malarial?) influence at work in the production of this disease, as it is of such frequent occurrence, and no other cause is assignable; many of them run a long course, and have to be scraped or removed before recovery takes place."

The above statement indicates that extreme caution should be exercised before the mere existence of enlargement of the inguinal gland should be regarded as pathognomic of plague.

H. J. DYSON, F.R.C.S.,
Sanitary Commissioner.

Telegram, dated 11th October 1896.

From—Howrah,	To—Darjeeling.
From—Sanders,	To—Hospitals, Bengal.

Have seen Cotta—a typical case, syphilitic buboes. No fever. No cause for alarm.

Letter from—Surgn.-Lieut.-Col. Sanders.

36, CHOWRINGHEE,
The 11th October 1896.

DEAR DR. ROSS,

I got your telegram this morning at 10 A.M., and at once went to Howrah. I saw and carefully examined J. Cotta.

History.—He lived with his parents in the Byculla quarter of Bombay, said to be three miles from Mandvi; he never went to Mandvi.

He left for Calcutta on September 23rd, and travelled in the same carriage with his sister and her children, arriving at Calcutta on the 26th. The sister and the children have remained perfectly well. On October 2nd he went as an out-door patient, giving the assumed name of Maddox, to the General Hospital at Howrah.

The Assistant-Surgeon Mr. Mitchell found that he had a sore on his penis and buboes. He gave him blackwash for the sore, and I forget what for the buboes (*Cotta's statement*). On October 7th he applied for admission to the Hospital as an in-door patient, and said his sister would pay for his keep. He was told to get a letter from his sister, and went away, not returning to the Hospital.

On October 8th a police report was sent that there was a suspicious case of fever with buboes. This Mr. Cotta was then examined by Dr. Tomes first, and then by Dr. Tomes, Dr. Cobb and Dr. Simpson; and they pronounced the disease to be bubonic plague.

Present condition: Sunday, October 11th.—Found dressed and sitting in a chair; no fear; no symptoms of having been ill. Temperature normal; pulso quiet and regular.

Tongue clean; appetite good. On each side of the abdomen above Poupart's ligament, a large bubo, one on either side, larger on the left than the right; no sign of suppuration, and but very little pain on pressure. Admits having been with girls in Bombay, and to have had a sore first, followed by these buboes.

On the inner side of the arms and on the front of the forearm, on the right side, a very suspicious rash rose faint when seen by me, but stated by his sister to be much more marked when he gets warm. It looks very like a commencement of the rash secondary syphilis.

I am sure the case is nothing more than an ordinary bubo, following a chancre on the penis.

I have never seen a case of plague, but I am sure I cannot be mistaken in an ordinary case of syphilitic bubo.

If any case of plague is reported, I will personally see it and wire you the result.

P.S.—I am willing to take all responsibility for this report, and to treat the man in the Mayo Hospital.

Letter from—Surgn.-Lieut.-Col. Sanders,

Dated 11th October 1896, 11-30 a.m.

J. Cotta lived with his parents in the Byeulla quarter of Bombay, said to be three miles from Mandvi. He left for Calcutta on September 23rd, and travelled in the same carriage with his sister and her children, arriving at Calcutta on the 26th September. On 2nd October he went as an out-door patient, giving the assumed name of Maddox, to the General Hospital at Howrah. The Assistant-Surgeon Mr. Mitchell found that he had a sore on his penis and buboes. He gave him blackwash for the sore, and I forget what for the buboes. On October 7th he applied for admission to the Hospital as an in-door patient, and said that his sister would pay for his keep. He was told to get a letter from his sister, and went away and did not return to the Hospital.

On October 8th a police report was sent that there was a suspicious case of fever with buboes. This Mr. Cotta was then examined first by Dr. Tomes and afterwards by him in company with Drs. Cobb and Simpson, and they pronounced the disease to be bubonic plague.

Dated Calcutta, the 15th October 1896.

Deputi-official from—Surgn.-Maj. R. Cobb, Offg. Surgeon Supdt., Presidency General Hospital,

To—The Inspector-General of Civil Hospitals.

The first case I saw was Cotta. Dr. Simpson and I examined the blood and found characteristic diplobacteria, similar to those described in works on Bacteriology, and exactly like those in Dr. Simpson's possession from Bombay.

They were also found in the serum drawn from the gland.

2. Similar bacteria were found in the blood in the case of Grace Hodges, who had glandular enlargements with fever.

3. Also in the case of the boy Heman Shaw.

P.S.—Dr. Simpson had the notes, so I was unable to reply to yours at once.

Dated Howrah, the 12th October 1896.

From—Surgn.-Maj. A. Tomes, Offg. Civil Surgeon, Howrah,
To—The Magistrate of Howrah.

With reference to your letter of yesterday on the subject of Mr. Cotta's illness and Dr. Sanders' opinions, I am still strongly of opinion that the case is one of *pestis ambulans*, the mild form of plague.

Dr. Cobb, Dr. Simpson and myself thoroughly examined the young man, having specially in view at the time any possibility of syphilis, and after careful consideration, came to the conclusion that the case was not one of syphilis.

I may mention that at the commencement of plague, medical men have at times mistaken the glandular swelling in the groin for syphilitic buboes, and in this case Dr. Sanders appears to have fallen into error.

I feel it is my duty to warn you that this case is not syphilis, but plague, and that if the patient had not been isolated, he would be a danger to the community.*

Dated Calcutta, the 12th October 1896.

Memo. by—Surgn.-Maj. A. Tomes, Offg. Civil Surgeon, Howrah.
Copy forwarded to the Sanitary Commissioner, Howrah, for information.

Dated Calcutta, the 15th October 1896.

From—The Inspector-General of Civil Hospitals, Bengal,
To—His Honor the Lieutenant-Governor.

We have examined four reported plague cases. In our opinion, Howrah case is venereal bubo; one child, Howrah, abscess in armpit. In Maniktola two cases ordinary fever. No case has any clinical appearance of plague. Letter follows.

No. 999, dated Howrah, the 15th October 1896.

From—Surgn.-Maj. J. H. T. Walsh, Offg. Civil Surgeon, Howrah, and Secretary of the Howrah General Hospital,

To—The Inspector-General of Civil Hospitals, Bengal.

I have the honour to report that there is no fresh case resembling bubonic plague in Howrah, and all necessary precautions are being taken.

* The Board did not call this a case of syphilis, but called it a case of venereal infection.

No. 1001, dated Howrah, the 16th October 1896.

From—Surgn.-Maj. J. H. T. Walsh, Offg. Civil Surgeon, Howrah,

To—The Inspector-General of Civil Hospitals, Bengal.

I have the honour to report that there is no fresh case resembling bubonic plague in Howrah, and all necessary precautions are being taken.

No. 1005, dated Howrah, the 16th October 1896.

From—Surgn.-Maj. J. H. T. Walsh, Offg. Civil Surgeon, Howrah,

To—The Inspector-General of Civil Hospitals, Bengal.

Since my arrival here on Tuesday, I have done my best to become acquainted with the history and symptoms of the case of Mr. Cotta. He arrived in Howrah on the 26th September. On the 28th September he suffered from "fever," and then attention was called to the fact that he was also suffering from large buboes in both groins. There is a history of unclean coition and the appearance of some small sores on the prepuce about the 16th September. Mr. Cotta left Bombay on the 23rd September, and at that time the glands in the groin were somewhat enlarged. In the same railway carriage there travelled his sister and other persons. These persons have shown no signs of illness, nor is there any evidence that any of them had been exposed to the danger of plague contagion in Bombay. A boy of about ten years of age has been in close attendance on Mr. Cotta, both in the plague hospital and in the isolation ward of the Howrah General Hospital. This boy is in excellent health. I cannot here enter into details, but I have very good reasons for considering that the case is not one of syphilis. So far, and in the absence of other evidence, I should at once accept these buboes as the result of infection from venereal sores, and no question of the "bubonic plague" would exist. The Health Officer of Calcutta examined the patient's blood, and in it he found a variety of diplococci resembling, though perhaps not identical with, the micro-organisms found in the cases of plague in Bombay. I have been able, through the courtesy of Dr. Simpson, to examine a number of slides, including specimens from Bombay. I am also acquainted with the drawings made of the bacillus found by Yersin in cases in Hong-Kong. Although, from a clinical point of view, I am inclined to believe that no case of true virulent bubonic plague has as yet appeared in Howrah, I think that, in Mr. Cotta's case, further independent bacteriological researches should be made. Mr. Cotta's case may be, as I have seen stated, a mild case of "*pestis ambulans*," but whether identical with the plague, as I understand that disease, has yet to be proved. The ways of the bacteriologist are full of difficulties, and we may be dealing after all with some new form of disease.* One point is, I think, clear, that there is no occasion for any panic, and that any attempt to make the people over-anxious is to be deprecated. At the same time, so long as the plague continues in Bombay, the same care should be taken to detect and prevent it in Calcutta. It is better even to err on the side of over-carefulness. Mr. Cotta is doing well; the buboes will, in course of time, suppurate, and the final treatment will be surgical.

No. 1010, dated Howrah, the 17th October 1896.

From—Surgn.-Maj. J. H. T. Walsh, Offg. Civil Surgeon, Howrah, and Secretary of the Howrah General Hospital,

To—The Inspector-General of Civil Hospitals, Bengal.

I have the honour to report that there is no fresh case resembling bubonic plague in Howrah, and all necessary precautions are being taken. Mr. Cotta is doing well.

No. 1013, dated Howrah, the 18th October 1896.

From—Surgn.-Maj. J. H. T. Walsh, Offg. Civil Surgeon, Howrah,

To—The Inspector-General of Civil Hospitals, Bengal.

I have the honour to report that there is no fresh case resembling "bubonic plague" in Howrah, and all necessary precautions are being taken. Mr. Cotta is doing well. This morning it was reported to me that a syco in the employ of a European gentleman in Howrah was suffering from plague. I visited the case at once, and found the man suffering from gonorrhœa with orchitis.

No. 1023, dated Howrah, the 20th October 1896.

From—Surgn.-Maj. J. H. T. Walsh, Offg. Civil Surgeon, Howrah,

To—The Inspector-General of Civil Hospitals, Bengal.

I have the honour to report that there is no fresh case resembling "bubonic plague" in Howrah, and all necessary precautions are being taken. Mr. Cotta is doing well. Specimens of blood were taken this morning for examination by Brigade-Surgeon-Lieutenant-Colonel D. D. Cunningham.

* Mr. Cotta's case in some of its aspects resembles mild cases reported from Yunnan.

16th.—Have again inspected all cases. All doing well, except Heman Shah; weak, but no fever or bubo.

20th.—Cotta was put under chloroform, and the left bubo was incised, and four cultivations and two slide preparations of his blood were taken.

No. 1027, dated Howrah, the 21st October 1896.

From—Surgn.-Maj. J. H. Tull Walsh, Offg. Civil Surgeon, Howrah,

To—The Inspector-General of Civil Hospitals, Bengal.

I have the honour to report that there is no fresh case resembling "bubonic plague" in Howrah, and all necessary precautions are being taken. Mr. Cotta is doing well. Kindly let me know if he may be removed from the isolation ward.

Dated Calcutta, the 23rd October 1896.

From—Surgn.-Capt. H. J. Dyson, F.R.C.S., Sany. Commissioner for Bengal, Acting Secretary to the Medical Board,

To—The Civil Surgeon of Howrah.

With reference to your letter No. 1027, dated the 21st instant, asking for instructions as to whether Mr. Cotta, who is said to be doing well, may be removed from the isolation ward, I have the honour to say that in a matter of this kind you should use your own discretion.

No. 1030, dated Howrah, the 22nd October 1896.

From—Surgn.-Maj. J. H. T. Walsh, Offg. Civil Surgeon, Howrah, and Secretary of the Howrah General Hospital,

To—The Inspector-General of Civil Hospitals, Bengal.

I have the honour to report that there is no fresh case resembling bubonic plague in Howrah, and all necessary precautions are being taken. Mr. Cotta is doing well.

No. 1040, dated Howrah, the 24th October 1896.

From—Surgn.-Maj. J. H. Tull Walsh, Offg. Civil Surgeon, Howrah,

To—The Inspector-General of Civil Hospitals, Bengal.

I have the honour to report that there is no fresh case of "bubonic plague" in Howrah, and all necessary precautions have been decided that it was not a case of "bubonic plague." I have removed him from the isolation ward, and his name will not in future appear in these reports. With your permission these reports will cease until a suspicious case does occur.

CASE NO. II.—REPORTED CASE OF PLAGUE AT CHATAWALA GULLIE.

Reported cases of plague which have not been seen.—It was reported that the daughter of an officer in the Preventive Service was suffering from plague, and that bacilli were found in her blood. The parents declined to allow her to be sent to the Isolation Hospital. The following letter from Dr. Panioty throws some light on the case. He writes to the Secretary of the Mysore Hospital as follows:—

"Sir,—With reference to your letter No. 81, dated 5th October 1896, requesting me to inform the Surgeon-Superintendent of any suspicious case, I have the honour to submit for his information the following facts, as the newspaper reports are not correct, regarding the girl Gortie Hodges of Chatawala Gullie. I have seen Dr. Ferris about the case, and he informs me that when he saw the child on Saturday morning, the 10th instant, there was no fear, and that the child was apparently in good health as anybody. He did not pronounce the case to be one of mumps, and he told the mother that the child did not want any treatment, as the mother informed him that the swelling had subsided a good deal, and that she painted the neck with bollaonna, as the iodine with which she had painted the neck caused the child some pain. Exactly the same symptoms were noticed here. When the child was brought here on the 9th October last, there was no fever, the child was in good health, only that the submaxillary and cervical glands were somewhat enlarged. Bollaonna was painted and some medicine given, and the child has never been brought here any more, although the papers say he was brought here on Sunday morning. I examined the child and beyond symptoms noted, there were signs of inherited syphilis, such as well marked Hunterian tooth, enlarged cervical glands, etc. When the Medical Inspector called on me on the afternoon of the 9th instant, I mentioned the case to him, not as any suspicious case, but one into which he may look, owing to the unhealthy locality from where the child comes. I even told the Medical Inspector that two or three years ago I had treated the sister for syphilitic sore of one of her legs."

JOHN E. PANIOTY, Resident Surgeon,
Chandney Hospital.

Bacilli were found in the blood by Drs. Cobb and Simpson.

Case Nos. III and IV.—A Report on the cases of Plague in the Manicktollah Isolation Hospital of Calcutta.

On the 13th of October Drs. Ross, Sanders, and Dyson inspected the Manicktollah Isolation Hospital. Dr. Simpson was invited to attend, but was unfortunately unable to do so, as he did not get the letter in time.

The spot selected for the hospital appears a suitable one, and the erection of hospital sections is being rapidly carried out. There are two native doctors living in the enclosure, in tents, and a small brick building is utilized as a temporary hospital. It contained two cases, one named Tin Cowry Charan Pal, the other Heman Shah.

Tin Cowry Charan Pal is a Hindu boy and works in a jeweller's shop, and is thus brought considerably into contact with Marwaris. He has no history of any accident which might cause enlargement of the glands.

Previous history.—Had lymphatic swelling of the right thigh nine or ten years ago, forming deep-seated abscess, which had to be operated on. In 1895 was first affected with cholera, and then with small-pox; for the last two years since he began to work, he has now and then suffered from fever, cold and swelling of the inguinal glands. On the 5th he was attacked with fever, and next day had slight swelling of the inguinal glands, which were a little tender; he was treated for fever. Dr. Cobb and Dr. Simpson examined his blood and found bacilli. He was admitted into the Isolation Hospital on the 11th with a temperature of 103°. On the 12th it was 100°, and on the 13th normal. He was found to be a fairly well-nourished boy of a cheerful appearance, with a clean tongue and clear eyes—no headache. The inguinal glands were slightly enlarged, but not markedly so. His tongue was clean, and he had no other symptoms.

Heman Shah, a boy, is by trade a hawkor, and therefore exposed to all vicissitudes of temperature and climate. He was attacked on the 10th, and bacilli were found in his blood. When seen at hospital on the 13th, his temperature was 102, face a little sunken, breathing slightly quickened, eyes clear, no headache, tongue bright red, with the papillae enlarged and prominent. He has gurgling in the iliac fossæ; the inguinal glands are practically not enlarged. He has symptoms of commencing pneumonia in the left lung, and the rise of temperature may be due to it. He presents the appearance of an ordinary fever case.

Remarks.—If Tin Cowry Charan Pal's case is one of plague, it certainly is a wonderfully mild form. He acquired fever on the 5th, and two days after admission into hospital, where he is carefully treated and fed, is free from fever, and practically has no buboes.

It was decided at a meeting of the Corporation, the Board of Health being present, that these two cases might be discharged from hospital.

Case Nos. V and VI.—The suspicious cases in the Presidency General Isolation Wards.

On October 17th, Drs. Ross and Dyson visited the Presidency General Hospital to examine two people who have been placed in the infectious wards as suspicious cases. They are respectively a small male child and a young man. Their histories are as follows:—

The child, 3 years of age, was born in Sylhet, and has repeatedly suffered from attacks of malarial fever. He has slightly enlarged glands under the jaw and in the armpits and groins, and has also inflamed tonsils. The glands are apparently not tender to the touch. His temperature on Thursday, the 15th, rose to 102°. Present condition: no marked distress in the face; tongue clean; conjunctivæ morbidly white and glistening; no enlargement of the spleen. The child appears to have a serofulens diathesis. No other symptoms of plague.

The young man, Douglas, is a bridge inspector; he states that he strained himself on the 23rd September, and found the glands of the left groin were slightly enlarged on the 26th. Five glands in all were enlarged. He continued his work, and walked regularly 2 to 2½ miles daily. He found that walking made the glands worse. He was admitted into hospital on the 13th October. He then had five enlarged glands; there are now only two, neither are markedly tender. His temperature has for days been normal. He is a poorly nourished man, with a thin face. His eyes are bright and clear and he makes no complaint of headache. He has had blood abstracted for bacteriological purposes by Dr. Cobb, but the result is not known. He has been in the infectious ward two days. He looks as if he needed feeding up, otherwise seems healthy enough and comfortable.

The child has left the hospital some days ago; the other case remains under treatment.

Case No. VII.—Case of plague reported in Kilderpore.

No. 1123, dated Alipore, the 22nd October 1896.

From—Surgeon-Captain H. W. Pilgrim, M.B., Offg. Civil Surgeon, 21-Pinganas, Alipore,

To—The Secretary, Health Committee, C/o Inspector-General of Civil Hospitals, United Service Club, Calcutta.

With reference to your Circular No. 47, dated 16th instant, I have the honour to state that the Police asked me yesterday

afternoon to examine a girl 8 or 4 years of age, by name Annoda, residing at Pearatolla, beyond Garden Reach; the case was said to have been reported by a Native Practitioner, Girish Chunder Ghose, as being a case of plague. I went and examined the child who had been suffering from slight fever, and now has a few of the cervical and occipital glands enlarged. There was nothing in the symptoms or condition of the child beyond the slight enlargement of the glands so common in children to even remotely suggest the presence of plague.

Case No. VIII.—Case of plague reported in Raja Rajballub's Street. Extra from the Commissioner's Report Book, 1st Division Town, Section A, Shampookur, Case No. 4418 of the 4th November 1896.

At 10 A.M. one K. M. Mukorjee of No. 252, Upper Chitpur Road, informed by a letter that one Bipin Biharee Dutt is suffering from glandular fever at No. 1, Raja Rajballub's Street. Medical Inspector at once informed.

J. H. W.

BULLETIN FROM CALCUTTA MUNICIPAL LABORATORY.

Anti-Choleraic Inoculations done in Calcutta from 25th September to 21th December, 1896.

HINDUS.						MAHOMEDANS.						OTHER CLASSES.						Grand Total.
Adults			Children under 12 yrs.			Total.	Adults			Children under 12 yrs.			Total.					
Male.	Female.	Total.	Male.	Female.	Total.		Male.	Female.	Total.	Male.	Female.	Total.						
30	3	2	10	45	5	2	11	15	33	78			

N. B.—Of 78 persons inoculated, 45 were Hindus, including 1 Brahmin and 33 Mahomedans.

The following case occurred in a house where inoculations were previously done:—

In Tooni Bewah's house at 31, Kurraya Road, Ward 21, 1 person out of 7 was inoculated on 4th April, 1895. One out of the uninoculated 6, named Jainab, Mahomedan, female, 24 years, was attacked by cholera on 27th November, 1896, i.e., 602 days after inoculation in the house, and died on the same day.

Correspondence.

THE PRESERVATION OF VACCINE LYMPH.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—Dr. King in the December number of your paper has written an article on "The Preservation of Animal Lymph, Vaseline or Lanoline."

In this article he has criticised my Report on Vaseline Vaccine, which appeared in the Vaccination Report for the Punjab for 1895-96. Dr. King gives experiments which he carried out in 1890 which proved lanoline to be superior to vaseline as a preservative. He gives us no details as to the number of his experiments on which he founded his opinion that lanoline was superior to vaseline. Dr. King seems to think that I wish to disparage the valuable work done by him. I wish to point out that I had no such intention, and the little I may have done has been following in his footsteps.

As I show in my Report I tried glycerine, lanoline and vaseline and my results, which were afterwards confirmed by Dr. James, seemed to show that vaseline was the most successful, and for that reason vaseline has been used by me and is now being used in the Punjab. He says that I am advertised against the pots used for distributing lanoline lymph in Mysore. I merely incidentally mentioned that I thought the German tubes superior to the pots. I may remark that if I had not seen the tubes I should have undoubtedly used the pots.

Dr. King mentions that vaseline is used and has been used for some time at Bordeaux, of this fact I was not aware; but I think this shows that vaseline has been successful there, as it now is in Rawalpindi. When I began my experiments I was not aware of the fact that Dr. King had tried vaseline and found lanoline better, if I had been I might not have tried vaseline. Dr. King then states that I claim economy of manufacture, ease of transport, etc., as being an advantage especially claimed for vaseline. If he refers to my Report he will find I did no such thing, but by a printer's error "vaseline" was inserted before "vaccine." Where the line runs "the advantage of vaccine preserved in some medium

as glycerine and vaseline are cheapness &c." The word vaseline was taken from the lower line and inserted in the upper line and vaccine put in the lower line in place of vaseline. Dr. King then refers to disadvantages enumerated by me and quotes from Dr. James' Report and not mine. One point however I may here refer to and that is with regard to Dr. King's remarks as to vaseline being more acceptable to Hindus. He says that the mixture used contains animal products derived from the sacred bull, he forgets however that no animal lymph from any calves but buffalo calves are used in the Punjab or have ever been so. In these matters I believe publicity to be the best thing, so I have shown the whole process of manufacture to natives of all classes, so that they know that vaseline vaccine consists of a small quantity of vesicles taken from the buffalo and the rest vaseline a mineral substance.

Hindus here tell me that they much prefer vaseline.

I hope you will be so good as to find space in your valuable paper for these remarks.

RAWALPINDI;
December 24th, 1896.

C. J. BAMBER, D.P.H. CAMBRIDGE,
Surgeon-Major, I.M.S.

THE HOWRAH CASE.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—Dr. Walsh's letter in the January number calls for some remarks to explain certain discrepancies.

1 The exact preliminary history of Cotta was taken by us (Drs. Simpson, Cobb and myself) on October 8th and 9th at his house and not at the hospital; this will account for its non-appearance in the hospital records.

2. The history of syphilis as given to Dr. Walsh was an afterthought of the patient and his relatives who became alarmed when they were told that sanitary precautions required to be taken. In the history given to us it was affirmed that no pimples appeared on the penis until not less than 14 days after the appearance of swelling in the left groin. Syphilis was denied by the patient.

3. It is satisfactory to note that Dr. Walsh on his visit to Dr. Simpson's laboratory did see diplo-bacteria taken from the blood of Cotta, which resembled the Bombay bacillus.

4. The chance of getting cultures of diplo-bacteria from a drop of finger blood in a case of pestis ambulans is not to be expected to be successful on every occasion; it is therefore not surprising that Drs. Vaughan and Walsh did not succeed.

5. It is far more likely that the history given to us in the first instance is correct than that given to Dr. Walsh and others subsequently when a state of alarm had been set up among the patient's friends.

6. In the discussion at the Epidemiological Society, reported in the *British Medical Journal* of December 26th, it was noted that a similar disease, pestis minor, prevailed in China before the occurrence of plague in a severe form, and it is there mentioned that Kitasato found the same bacillus in the minor cases, a fact evidently unknown to Cobb and Simpson when they published the paper.

GATA,
17th January. }

A. TOMES, M.D.,
Surgeon-Lieut.-Colonel.

Appointments, Leave, &c.

BENGAL.

Assistant Surgeon Ganga Gohinda Sircar, in temporary medical charge of the civil station of Noakhali, is appointed Teacher of Medical Jurisprudence and Therapeutics in the Dacca Medical School, vice Assistant Surgeon Chooney Lal Dass.

Assistant Surgeon Nripendra Nath Basu is appointed to do supernumerary duty at the Medical College Hospital, Calcutta, until further orders, with effect from the 9th December 1896.

2nd Class Assistant Surgeon Patrick Victor to be 1st Class Assistant Surgeon, with effect from the 19th October 1896, vice Senior Assistant Surgeon and Honorary Surgeon-Lieutenant G. T. Leopold, retired.

With effect from the date on which he assumed charge, Surgeon-Lieutenant-Colonel E. G. Russell, Professor of Materia Medica and Clinical Medicine in the Medical College, Calcutta, and ex-officio Second Physician to the College Hospital, is also appointed to be Medical Inspector of Emigrants to the labour districts of Assam, vice Surgeon-Lieutenant-Colonel J. F. P. McConnell, deceased.

anmpati is appointed to the Nadia district,

of the Chittagong Dispensary is appointed to do supernumerary duty at the Mitford Hospital, Dacca, until further orders.

Assistant Surgeon J. M. Pereira, M.B., of the Krishnagar Dispensary, is appointed to the medical charge of the Chittagong Dispensary, vice Assistant Surgeon Hori Mohun Sen.

With effect from the date on which he assumed charge, Assistant Surgeon Norendra Nath Gupta is appointed temporarily to have medical charge of the civil station of Noakhali during the absence on deputation of Surgeon Captain Narendra Prosunno Sinha or until further orders.

With effect from 18th November 1896, Surgeon-Captain F. O'Kieally, on general duty at the Presidency, is appointed to act as Second Resident Surgeon, Presidency General Hospital, during the absence, on deputation, of Surgeon-Captain D. M. Moir, or until further orders.

This cancels the Notification No. 4475 Med., dated the 30th November 1896.

With effect from the 4th December 1896, Military Assistant Surgeon P. Victor is appointed to act at the Presidency General Hospital, Calcutta, during the absence, on deputation, of Military Assistant Surgeon W. Clarke, or until further orders.

First Grade Assistant Surgeon Aupoorba Krisbna Dass is dismissed from the service of Government.

Surgeon-Captain J. R. Adie was employed on general duty at the Presidency, and was attached to the Presidency General Hospital from the 21st to the 31st March 1896 (both days inclusive).

Assistant Surgeon Jogendra Nath Basu of the Puri Charitable Dispensary held medical charge of the civil station of Puri, in addition to his own duties, from the forenoon of the 11th October to the forenoon of the 9th November 1896.

Surgeon-Captain A. R. S. Anderson is appointed to act as Professor of Comparative Anatomy and Zoology, Medical College, Calcutta, during the absence, on leave, of Surgeon-Captain A. W. Aleck, or until further orders.

BOMBAY.

Surgeon-Captain W. E. Jennings, M.B., C.M., and Surgeon-Major F. F. MacCartio, M.B., respectively delivered over and received charge of the office of the Health Officer of the Port of Bombay on 17th December 1896, after office hours.

His Excellency the Governor in Council is pleased to appoint Surgeon-Captain S. H. Burnett, M.B., C.M., to be District Medical Officer, Sholapur, and Surgeon-Captain J. Lloyd T. Jones, M.B., to be District Medical Officer, Ahmednagar.

NORTH-WESTERN PROVINCES AND OUDH.

With effect from the 18th August 1896, *vice* Surgeon-Captain D. W. Scotland, confirmed as Civil Surgeon, 2nd class—

Surgeon-Captain H. B. Melville, Officiating Civil Surgeon, to be Civil Surgeon, 2nd Class, substantive *pro tempore*, continuing to officiate as Superintendent, Central Prison, Lucknow.

The services of Surgeon-Captain H. B. Melville, M.B., C.M., I.M.S. (Bengal), are placed permanently at the disposal of the Government of the North-Western Provinces and Oudh.

Assistant Surgeon Annada Prasad Datta of the Provincial Staff, North-Western Provinces and Oudh, leave on medical certificate for nine months and fourteen days, in continuation of that granted by Medical Department Notification No. 7335, dated 13th December 1895.

Third Grade Assistant Surgeon Chandra Mohan De, attached to the Haldwani Dispensary, Naini Tal, was on leave (medical certificate) for one month and 7 days from the 17th October to 23rd November 1896, both days inclusive.

3rd Grade Hospital Assistant Bahadur Singh on Reserve duty, Naini Tal, held charge of the Haldwani Dispensary, during the absence, on sick leave, of Assistant Surgeon Chandra Mohan De, from the 17th October to 23rd November 1896.

Surgeon-Captain H. W. Elphick, Civil Surgeon, on return from leave to the Muzaffarnagar district.

Surgeon-Captain J. Davidson, M.B., C.M., Bengal Establishment, whose services have been temporarily placed at the disposal of this Government, to be on special duty in connection with famine operations in the Allahabad Division.

Honorary Surgeon-Lieutenant George Thornhill Leopold, Senior Assistant Surgeon, Indian Subordinate Medical Department is permitted to retire from the service, with effect from the 20th October 1896, subject to Her Majesty's approval.

The services of Surgeon-Captain J. Chayter-Whito, M.D., C.M., I. M. S. (Bengal), are placed temporarily at the disposal of the Government of the North-Western Provinces and Oudh with effect from the date on which he assumed charge of his duties in those Provinces.

The services of Surgeon-Captain J. Davidson, M.B., C.M., Bengal Establishment, are placed temporarily at the disposal of the Government of the North-Western Provinces and Oudh for employment on famine duty with effect from the date on which he may assume charge of his duties under that Government.

Under instructions from the War Office, Brigade-Surgeon-Lieutenant-Colonel M. M. Galloway, Army Medical Staff, will proceed to England during the trooping season, 1896-97, and will be detailed by the Principal Medical Officer, Her Majesty's Forces in India, for duty with troops on the homeward voyage.

Surgeon-Lieutenant Sydney Morgan Whittaker, East Indian Railway Volunteer Rifle Corps, is granted leave out of India for four months on private affairs.

The leave granted to Surgeon-Captain F. Wyrville Thomson, Indian Medical Service, in Command Order No. 302 of 1896, is extended for one day.

The leave granted to Surgeon-Captain B. R. Chatterton, Indian Medical Service, in Command Order No. 302 of 1896, is extended for one day.

CENTRAL PROVINCES.

On return from the six months' furlough granted him by Departmental Order No. 72, dated the 1st June 1896, 1st Class Civil Hospital Assistant Anwar Ali is directed to do duty under the orders of the Civil Surgeon, Bhandara.

On return from the privilege leave granted him by Departmental Order No. 106, dated the 17th September 1896, 3rd Class Civil Hospital Assistant Ramkrishna Lal is directed to do duty under the orders of the Civil Surgeon, Jabalpur.

The following Civil Hospital Assistants, doing duty under the orders of the Civil Surgeon, Nagpur, are directed to do duty under the orders of the Civil Surgeons noted against their names:—

Ujagar Pershad, 2nd Class—Hoshangabad.

Ramkrishna Paikaji, 3rd Class—do.

Lakshman Pershad, 2nd Class—Saugor.

Vithal Moreshwar, 3rd Class—do.

Sheikh Mohiuddin, 1st Class—Balaghat.

Third Class Civil Hospital Assistant Motiram Tiwari, doing duty under the orders of the Civil Surgeon, Wardha, is directed to do duty under the orders of the Civil Surgeon, Saugor.

First Class Civil Hospital Assistant Hashmat Ali, doing duty under the orders of the Civil Surgeon, Raipur, is directed to do duty under the orders of the Civil Surgeon, Seoni.

Third Class Civil Hospital Assistant Ghulam Ali, doing duty under the orders of the Civil Surgeon, Raipur, is appointed to the Drug Branch Dispensary, Raipur District.

On being relieved by Civil Hospital Assistant Ghulam Ali, Passed Medical Pupil Sobharam, attached to the Drug Branch Dispensary, Raipur District, is directed to do duty under the orders of the Civil Surgeon, Narsinghpur.

Third Grade Assistant Surgeon Dhalip Singh Teja, whose services have been placed temporarily at the disposal of the Chief Commissioner, Central Provinces, by Notification of the Director-General, Indian Medical Service, No. 62, dated the 11th instant, reported his arrival at the office of the Administrative Medical Officer on the forenoon of the 5th idem.

He is directed to do duty under the orders of the Civil Surgeon, Nagpur, until further orders.

Surgeon-Major E. O. Milward and Surgeon-Major E. R. Cree, respectively, made over and assumed charge of the office of Civil Surgeon, Pachmarhi, on the forenoon of the 13th instant.

The services of Third Grade Assistant Surgeon Dhalip Singh Teja, of the Imperial Establishment, are placed temporarily at the disposal of the Chief Commissioner, Central Provinces.

Public acknowledgments.

JOURNALS RECEIVED.

Lancet—British Medical Journal—The Practitioner—Edinburgh Medical Journal—American Journal of Obstetrics—Dublin Journal of Medical Science—Archives of Gynecology and Obstetrics—Manual of Gynecology and Padiatry—Therapeutic Gazette—Provincial Medical Journal—The Journal of the American Medical Association—New York Medical Journal—Medical Record, New York—Boston Medical and Surgical Journal—Times and Register, Philadelphia—Abstract of Sanitary Reports, United States—Occidental Medical Times—Merk's Bulletin of Advanced Medicine and Surgery—Medical and Surgical Reporter—The American Journal of the Medical Sciences—Chronicle—Times and Register—Sanitary Circular—La Tribune Medicale—La Hebdomadaire—Les Cliniques de Bordeaux—Journal—Dietetic and Hygienic Gazette—Toledo Medical Compend—The Bristol Medical-Chirurgical Journal—Pacific Medical Record—Le Mercredi Medical—Annales de La Polielinique De Lille—United Service Gazette—Indian Medical Record—Indian Medical Reporter—Indo-European Correspondence—Indian Medical Chirurgical Review—O. Archivo Medico da India, Goa.

BOOKS AND PAMPHLETS RECEIVED.

Diseases and Defective House Sanitation. By W.H. Corfield, M.A., M.D., F.R.C.P.
Compressed Air Illness or so-called Caisson Disease. By E. Hugh Snell, M.D.

COMMUNICATIONS RECEIVED.

Surgeon-Major C. J. Bamber, Rawal Pindi—Surgeon-Lieut.-Col. A. Tomes, Gaya—Surgeon-Captain F. P. Maynard, Ranchi—Professor Haffkine, Bombay—Surgeon-Captain D. M. Moir, Calcutta—Dr. Kodar Nath Das, Calcutta—Surgeon-Major T. H. Walsh, Midnapore—Dr. R. D. Sinha, Rajputana—Dr. Kenneth McLeod, London.—Surgeon-Captain Fink, Assam.

Original Communications.

THE MALARIAL PARASITE,

BY SURGN.-MAJOR J. H. TULL-WALSH.
With Plate.

(Concluded from page 436, Dec. 1896.)

WE will now pass on to a more detailed consideration of the *Plasmodium malariae* and the evil which it works in the blood. It acts mainly, and with destructive force, upon the red blood-cells and presents itself for our observation under two main types:—

A.—The *amoeboid stage* which passes through two phases, one of development and one of reproduction. At first hyaline and gradually growing it becomes pigmented as it approaches the period of full growth. The pigment is derived from the colouring matter of the red blood-corpuscles. As the *Plasmodia* reach the pigmented stage they increase in size, and often occupy the greater portion of the blood-cell, causing frequently its entire destruction. The stage of growth ended the reproductive stage commences. It is then that the central pigment becomes scattered in little groups near the periphery of the *Plasmodium*. The reproductive division of the parent *Plasmodium* varies somewhat, according to different observers, but in the main it is a radial division into 4-6-8-10-12 daughter-cells, which are liberated by the bursting of the outer layer of the mother-cell. This process of sporulation lasts for two-three hours and is contemporary with the early part of the febrile attack, and a crop of *Plasmodia* are let loose in the body to pass through the various phases of development until a fresh reproductive sporulation causes a fresh attack of fever. It has occurred to me that we might explain some of the irregular forms of *malarial fever* by supposing a want of synchronism in the division and sporulation of large numbers of *Plasmodia*. The daughter-cells are hyaline, bright and refractile bodies, $\frac{1}{12}$ to $\frac{1}{8}$ the size of a red blood-cell.

The *Plasmodium malariae* is generally of a spherical form, but like all *amoebae* liable to alterations in shape. See Plate. Dr. Spener likens its form to that of a bi-concave lens, holding that it is thicker near the margin than at the centre. This may be the case, but is difficult to observe. Dr. Spener's conclusion is, however, strengthened by the appearance of certain forms, notably the small "annular forms" of *quotidian ague*. Through the central portion, in the early stages before the *Plasmodia* have become pigmented, is seen the colouring matter of the blood-cell. Taking the red blood-corpuscle as our standard, the *Plasmodium malariae* varies in size from $\frac{1}{8}$ to $\frac{1}{2}$, or, in a few cases, to nearly the full size of the blood-cell; those of *tertian* and *quartan ague* are generally the largest. The *Plasmodium* is, except where pigment is collected, clear and practically colourless, and

appears to be a fairly homogeneous mass of protoplasm. Some authors describe a thickening of the outer part which they call *ectoplasm*, and this part they say stains, with methylene blue, darker than the rest of the organism, which, indeed, in my experience rarely stains well at all. The pigment which at some periods is collected near the centre of the *Plasmodium malariae* is, at other times, seen scattered near the periphery. There is seldom more than one *Plasmodium* in each red blood-corpuscle and it may be central in position or, as is more generally the case, near the periphery. They may also be seen free in the serum. In the serum, also, is seen free pigment resulting from the destruction of red blood-cells, or from the debris of the *Plasmodia*. This is especially evident in chronic cases of *ague* and in *malarial anæmia*. Often the white blood-cells may be seen to have absorbed some of this stray pigment; these cells Laveran calls "leucocytes mélanifères." The phagocytes likewise devour the *Plasmodia*, and it is no doubt mainly through their activity that the blood is cleared of the parasites. Cold diminishes, while heat, when not too great, increases, the activity of the *Plasmodia*. Quinine and other reagents destroy them. According to Spener distilled water, salt solution of 0.5 to 0.75 per cent., weak acids and alkalis check the movements of the *Plasmodia* and finally destroy them.

B.—The second chief type of the malarial organism is the "crescent," or "sickle" shaped body, not always, however, of strict form. Though occurring in the red blood-cells it is generally seen free in the serum; it is motionless and generally much larger than the "amoeboid" forms. The "crescent" is generally hyaline and refractile with some granular pigment, usually near the centre of the concave margin. Certain authors describe the "crescents" as being sometimes of a reddish colour. Spener says that these bodies are found in the red blood-cells with the concave margin towards the centre of the cell; Vandyke Carter also depicts them in, or on, the red blood-corpuscles. I have but rarely seen these bodies, and then only free in the serum. They occur most often, in my opinion, in certain forms of prolonged *malarial fever*, and I have already expressed my view as to the nature of these bodies.

Spener thus describes the development of these "crescents":—"In a red blood-corpuscle there is seen a longish spindle-shaped body having pigment in its central portion; along with a gradual increase in size, this body curves into a "crescent shape." It passes through various shapes, but does not divide or sporulate. The ingenious suggestion has been made that the *tertian* and *quartan* cycles of development are the only ones, and that *quotidian ague* and the *irregular forms* are merely produced by several regular developmental cycles going on at the same time.

This is at present a theory only, and the *Plasmodia* seen in *quotidian ague* are somewhat different to those of *tertian* and *quartan ague*, and generally smaller.

In the case of *malarial remittents* we must suppose that there is more or less continuous sporulation going on in a parasite with a very brief cycle of development. The best time to find the *Plasmodia* in the blood-cells is just before the onset of an attack of fever while the daughter-cells may be seen free in the serum during, and sometimes after, the "period." Blood for examination is usually taken from the patient's finger, which should be washed with hot water and well dried. I do not approve of the use of strong antiseptics, since these may, and often do, cause alterations in the blood-cells taken for examination. It is well also in doubtful cases to examine the blood of the spleen; this may be taken with a sterilised hypodermic syringe. The finger when well dried should be smartly pricked with a needle that has been sterilised in the flame of a spirit lamp, and only very little blood should be taken on to a clean cover-glass. We require the thinnest layer possible of blood for examination, and this may be obtained by placing a clean cover-glass over the one containing the blood and sliding them gently over one another. Another method of spreading the blood, which I think preferable to the above, is that of laying the cover-glass on a "slide," and then rubbing gently until the blood is evenly distributed.

Should it be desired to stain the preparation, the cover-glass bearing the blood must be well dried and passed once or twice near the flame of a spirit lamp. The specimen may also be dried and fixed by placing the cover-glass over a 2% solution of osmic acid for about thirty seconds. The colouring matter of the *Plasmodia* stains well with methylene blue, fuchsine and gentian violet. All stains should be weak and prepared with the purest water. Rapid staining is effective with strong stains, but I prefer a long staining process (24 hours) with weak solutions.

When using gentian violet Delépine's method is a good one:— $\frac{1}{2}$ per cent. solution of acetic acid is poured on to the cover-glass, the excess of acid is blown off, and the specimen stained for five or ten minutes in gentian violet 11 parts, and aniline water (1 cc. A. oil to 9 cc. water) 100 parts.

In addition to the stains already mentioned, Plehn's combination of eosine and methylene blue gives a pretty preparation with slow staining. Plehn fixes his specimens with absolute alcohol, in which the cover-glass is left seven to ten minutes. He then stains with concentrated watery solution of methylene blue with half the volume of a $\frac{1}{2}$ % solution of eosine in 60% alcohol. The red blood-cells stain rose colour; the nuclei of the white corpuscles dark blue and the *Plasmodium malarie* a very faint blue.

In order to see the *Plasmodia* clearly, the microscope should be provided with an Abbe's condenser and objectives of $\frac{1}{2}$ " (oil immersion) or $\frac{1}{16}$ " (water immersion). Objectives of $\frac{1}{8}$ " or $\frac{1}{4}$ " may be used for clinical purposes by those who know what to look for. It is always desirable to examine the blood in a hanging drop or in a cell without pressure. For this purpose special slides can be purchased, but a cell is quite easy to make of wax or even vaseline.

While observing the *Plasmodium malarie*, Jaksch smears the under surface of the slide with aniline dyes. He, like other observers, concludes that, if we find these parasites in the blood during an attack of fever, we may be absolutely certain that we are dealing with a case of *malaria*.

Explanation of Plate.

FIG. 1.—Examples from a case of *quotidian ague*.

- a. Red blood-cells.
- b. *Plasmodium malarie*.
- c. Free pigment.

FIG. 2.—Examples from a case of *quartan ague*.

- a. Red blood-cell containing pigmented *Plasmodium*.
- b. *Plasmodium malarie*, free in the serum.

FIG. 3.—a, a. Ordinary crescents.

- b. Curious crescent-like body of which several were seen in a case of *remittent fever* under the care of Surgeon-Captain H. W. Pilgrim, I.M.S., who kindly allowed me to examine the case.

FIG. 4.—Selected examples.

- a, a, a. Red blood-cells containing *Plasmodia*.
- b. Nucleated white cell which has absorbed pigment.
- c. *Plasmodia malarie* free in the serum.
- d, d. Masses of free pigment in the serum.
- e. "Crescent."

FIG. 5.—Diagram of a cycle of development in *Plasmodium malarie*.

- a. Daughter-cell.
- b. Stages of growth.
- c. Mother-cell about to sporulate.
- d. Daughter-cells.

FIG. 6.—Flagellate forms of *Plasmodium malarie* (copied from Osler).

THE WEDGE OPERATION FOR ENTROPION AND TRICHIASIS.

By SURGN.-CAPT. H. HERBERT, F.R.C.S., ENG.,
Actg. Ophthalmic Surgeon, Bombay.

DURING the past year and a half I have operated on one hundred and thirty upper lids for entropion and trichiasis by Snellen's method, slightly modified, and have had excellent results from it. A large majority of the cases requiring it were combined entropion and trichiasis, some of them very bad indeed. The ordi-

TO ILLUSTRATE SURG.-MAJOR TULL-WALSH'S ARTICLE ON THE
MALARIAL PARASITE.



Fig. 1



Fig. 2



Fig. 3.

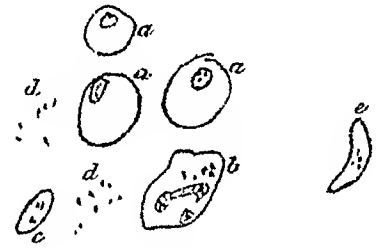


Fig. 4.



Fig. 5.

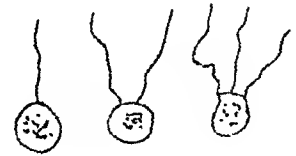


Fig. 6 (Osler)

For further illustrations of the *Plasmodium malariae*, see Osler, Vandyke Carter, Laveran, Marchiafava and Bignami, Sacharoff, etc.

nary Snellen's operation is insufficient for many of our old neglected cases, and success in them depends entirely on the observance of the details pointed out below. If the necessary rules are followed, the operation is equally suited to the mildest and to the most severe cases, to trichiasis as well as to entropion. The ordinary operation consists simply in the removal of a horizontal wedge of tarsus with its overlying muscle, the necessary incision having been made through the skin, and the parts are adjusted by Snellen's suturing. The points on which I wish to insist are:—

1. A strip of skin, 2 mm. broad, should be cut away at least in all bad cases, unless the skin be contracted and scanty. Otherwise it is redundant afterwards, and the upper lip of the wound tends to overhang the lower. It leads to no shortening of the lid beyond that produced by the excision of tarsus.

2. (a). The depth of the tarsal wedge removed should in all cases be sufficient to completely divide the tarsus. If the conjunctiva be penetrated in places, no harm results. The whole thickness of the tissue being divided, it is found that the conjunctiva and subconjunctival tissue are sufficiently loose or extensible to permit of very considerable displacement as well as rotation, of the lower segment of tarsus, which carries with it, of course, the border of the lid.

(b). The breadth of the wedge at its base depends largely on the degree of entropion existing. When the lower portion of the tarsus is much thickened and bent, the rounded swelling of its anterior surface renders it an easy matter, and indeed almost imperative, to remove a broader wedge than usual. But in some of the older cases of entropion the tarsus is much contracted vertically and the thickening involves the whole or greater part of it. One has to be careful in these cases not to remove too much, or the wedge may easily be made to include the greater portion of the tarsus.

(c). The position of the wedge is important. The strip taken should be as near the free margin of the lid as possible, *i.e.*, immediately above the roots of the eye-lashes. Thus we have quite a narrow strip of tarsus left below, and a comparatively broad plate above. So that when the anterior surfaces of the two are drawn together any displacement which may occur will be in the lower and not in the upper piece. The broad plate above affords a fixed basis from which one can work on the more readily moved and more readily moulded narrow marginal strip, with sutures.

3. It is in the suturing that Snellen's operation most distinctly fails to make the most of its opportunities. The sutures should be entered as in Green's operation. The curved needle is to be introduced a little behind the most posterior lashes, wherever they may be situated and passed obliquely forwards and upwards, to be brought out immediately above the lower

margin of the skin-wound. Thus the more the trichiasis or distichiasis the further back will the point of entry be; and when the sutures are pulled upon, the more will the border of the lid be brought forward. The needle should then be passed into the anterior surface of the upper piece of tarsus distinctly above the cut surface, and brought out again after taking a firm hold; neither skin nor muscle is taken up. Introduced into the tarsus thus, the sutures when tightened have distinctly more effect in bringing the eye-lashes forward than when introduced "through the upper lip of the tarsus below the wound."* The lower tarsal segment, with the lid border, tends to be drawn up on to the anterior surface of the upper segment.

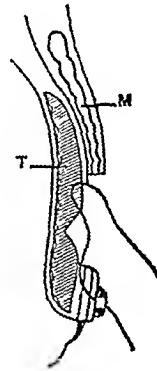


FIG A.
(Taken from Text book)
Snellen's Suture.

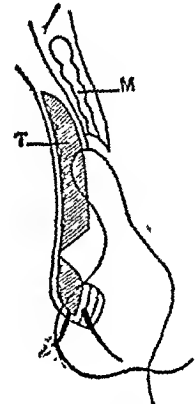


FIG B
Modified Suture.

Three such sutures are enough, tied in the ordinary way. It is quite unnecessary to tie them tightly. The parts must be simply retained in position, and not pulled forcibly into position by them. I have not had any sloughing of the lid margin; but it must be very easy to produce it by tying the sutures tightly. The two end sutures (of the three) require particular care in the tying, as the parts are apt to be held in their original position by the clamp. Two other sutures passed through the skin only suffice to bring the edges of the skin-wound into close apposition.

One of the main advantages of the operation is its inherent adaptability to the needs of individual cases. Well-developed entropion brings its own remedy in the broader wedge taken, and bad trichiasis or distichiasis ensures an application of the sutures which increases the displacement and rotation of the lid border. Its effect is permanent, except in cases where untreated trachoma again leads to cicatricial contraction. The shortening of the lid is slight and of no account in the great majority of cases. In bad cases there is apt to be a depressed line of scar left, unless care be taken that the edges of the skin-wound are in accurate apposition.

* Swanzy, Handbook of Diseases of the Eye, p. 166. This is the common description. Fuchs in his text-book directs the hold on the upper piece of tarsus to be taken through its upper border, *i.e.*, distinctly above the tarsal wound, as it should be.

CALF VACCINATION IN PRUSSIA.

BY W. J. SIMPSON, M.D., M.R.C.P., D.P.H.

CALF vaccination in India, and especially in Bengal, is in need of reform, and with the object of showing in what direction that reform could best be carried out, I republish in the *Indian Medical Gazette* my paper on calf vaccination in Prussia, which appeared in the *British Medical Journal* of October 10th. The paper is not intended to advocate the preservation of calf lymph in glycerine which, as has been shown by Surgn.-Lieut.-Col. W. G. King, is unsuitable for India, but a better system and greater care in the preparing of calf vaccine.

At a time when much public attention is directed towards vaccination against small-pox owing to the lesson conveyed by the catastrophe which has befallen Gloucester by its adherence to the teachings of anti-vaccinators, it occurs to me that a description of the Prussian system of calf vaccination as seen by me while on a short visit to Berlin would be of interest. There can be little doubt that anti-vaccinators have secured the sympathy, and sometimes co-operation, of many well-intentioned people by highly coloured descriptions of possible transference of diseases from child to child by means of human vaccine lymph; and the antipathy of this class to vaccination is really not so much to the use of a protective vaccine lymph as to the present system of arm to arm vaccination and its possible effects. It is to this class, and probably to a wider one, that the employment of calf vaccination under such a system as that pursued in Prussia would appeal as a relief to their doubts and prejudices, and it is an important question for the Government whether it would not be wise in the interests of public health to introduce the necessary machinery into England, so that those at least who preferred vaccination with calf lymph could have their preference respected and granted. It seems to me that every public vaccinator in England should have in his possession at his vaccine station supplies of calf vaccine, and that the poor people who attend these stations should be allowed their choice as to whether their children should be vaccinated with animal or human vaccine. I know that much calf vaccine is prepared and animal vaccination performed by Dr. Cory, the able director of the Government Vaccine Institute in London, but the work accomplished in comparison with that required is extremely small; it might even be said to be microscopic in extent, and it is certain that, while the system is not recognised as a duty belonging to Government, it is impossible that much progress in the direction of the supply of calf vaccine can be effected. The necessary funds and machinery require to be provided, which is only likely to be done when the Government recognise the important rôle in the

opposition to vaccination played by removable causes, such as the dislike of a large number of parents to their children being vaccinated with lymph taken from another child, and the further dislike to lymph being taken from the ripe vesicles on their child and transferred to the arms of other children.

There are eight institutions in Prussia such as the one I am about to describe. The one I saw, and the oldest, is at "Viehhof Central," on the outskirts of Berlin. Dr. Koch kindly arranged for me a meeting with Dr. M. Schulz, the director of the institution, who, with much patience and courtesy, showed me everything connected with the institute. It is situated close to the cattle market and slaughter-house of Berlin, in an airy and clean locality, and the building devoted to the vaccine preparation consists of a cowshed and two other rooms. The cowshed is well lighted and well ventilated with eight compartments on each side for the calves. It is excellently paved and drained, and is cleansed by means of a hose attached to a hydrant on the premises. On the pavement of the compartments there is placed an additional flooring, consisting of wooden laths fixed on iron rails, which can be taken up regularly and thoroughly cleansed and dried. This movable floor is sufficiently high to permit of the pavement underneath being thoroughly cleansed out by the hose without disturbance of the animal. On the wooden floor straw is spread, which forms a soft bed for the animals. Adjoining the shed is a good-sized room for vaccinating the calves; it contains two tilting tables with straps and pads so arranged that the calves can be fixed to the tables with the least possible trouble and with comfort to the animals. Next to this is another spacious room, in which the vaccine is prepared and put up in quantities suitable for storing.

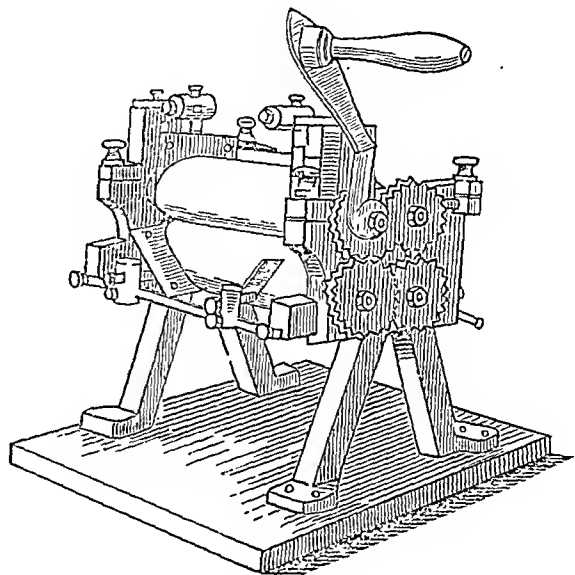
The calves are aged from 9 to 12 months, and cost 15 marks each. Females only are used, as they are cleaner and drier. There is no special preparatory quarantine insisted on, but a Government veterinary-surgeon examines the calves when brought by the contractor and rejects all that do not appear to him to be in perfect health. The passed animals are then sent to the institute; no animal is taken whose temperature is higher than 41° C. All calves are injected with 0.5 c.cm. of tuberculin, and the temperature taken twelve hours afterwards. They are kept in the stalls for twenty-four hours for the purposes of observation and rest, after which they are vaccinated. During the time the calves are kept at the institute they are fed on milk and eggs; each calf is fed three times a day, and at each meal it is given two eggs and nearly two litres of milk. The calf evidently relishes the eggs and takes the shell as well. An increase in weight is usually observed during their retention. To perform the vaccination, the animal is secured on the

tilting table, and when properly fixed is shaved from abdomen to buttocks and on the inside of the thighs. The groins are not shaved, it being found that the hair there protects the vesicles on the thighs and sides of abdomen, and prevents them from being rubbed. After shaving, the parts are cleaned with soap and water, then disinfected with 1 to 1000 corrosive sublimate or 3 to 100 carbolic acid solution, and finally washed with boiled water and dried with a sterilised cloth. The instruments employed are first sterilised and then kept in alcohol. When required they are taken out and a light applied to them to burn off the alcohol. Incisions as long as possible are made on the shaved parts, one set extending from the buttocks to the front part of the abdomen, the other set from the groin to the knee inside the thighs. These long incisions are preferred to smaller ones and to punctures or cross scarifications. It is found that they give more lymph and are less troublesome. After the incisions are made, an assistant stretches the parts and the lymph is spread over the incisions like butter over bread. The vesicles are usually ripe and ready for the removal of the lymph in 72 hours or may be 96 hours; occasionally, however, they are not ripe until 120 hours.

When the lymph is to be collected the calf is again fastened to the table, and the whole of the parts on which vesicles have appeared is cleansed with sterile water and soap, then dried with sterilised cloths, washed again with alcohol and dried again with sterile cloths. The lymph is then scraped off with a cup-shaped spoon, strong pressure being used on the instrument at the scraping, as this method ensures a greater freedom from blood than light scraping. The collected lymph is transferred at once to sterilised Petrie's dishes which have been previously tared (weighed). These are separately put on the balance, and to every part of lymph there is added 2 of sterilised water and 2 of glycerine. The glycerine used is that of Sarg of Vienna; it is very pure, and it is preferred to English glycerine, which has been tried, and which absorbs too much water and has too drying an effect on the lymph. The necessary proportions of glycerine and water having been added, the next step is to thoroughly mix them. This is done in a lymph mill or a mixer manufactured by Herr Julius Shober, 39, Adelbert Strasse, Berlin. It consists of four porcelain rollers which are fixed to a small turning machine, and so arranged that whatever passes between them when they are working is thoroughly mixed and is collected in a small vessel below. The diagram shows the lymph mill.

The cost of the mill is M. 100. The thicker portion of vaccine is put through the mill first, and then the remainder of the water and the glycerine. After use the mill is thoroughly cleaned with hot water, and the porcelain rollers

are kept in corrosive sublimate solution until next required.



LYMPH MILL.

The glycerinised lymph, having been collected in the flask placed below the lymph mill, is put into small sterilised bottles of 50 c.cm. capacity, and the bottles are closed by rubber corks which have been lying in a solution of corrosive sublimate. A label is put on to each bottle showing the number of the calf from which the lymph has been taken. These bottles are placed in an ice box and kept as stock. Under these conditions the lymph will keep good for at least a year. As the calf is slaughtered immediately it leaves the Institute and its condition noted, a check is maintained as to the state of health of the animal from which the vaccine is taken, and if the calf is not in perfect health as disclosed at the slaughter-house, the lymph can be destroyed and not used. Under this system there is no possibility of lymph from a diseased animal being used for vaccination purposes.

From the stock in the ice chest small tubes are filled when required. The tubes vary in size and contain sufficient lymph to vaccinate from 400 persons down to five. 1 c. cm. is found to be sufficient for 400 human vaccinations; 4 c. cm.'s are usually employed for a calf. When there were in Prussia only two institutes of this kind, one at Halle and the other in Berlin, as much lymph as would vaccinate half a million persons has been sent out from the Central Viehhof in one year. Now that there are eight institutions the amount is much less. The tubes are placed in small wooden cylindrical boxes, and these are enclosed in stout official envelopes and are sent by post.

Infants in Prussia are vaccinated in four places on the right arm, four places being the minimum allowed. Children are vaccinated in four places on the left arm. Every scholar in a public or

private school has to be revaccinated. Every soldier on entering the army has to be vaccinated for the third time. The successes obtained by using calf vaccine is seen in the following statement:—

Berlin, June 15th, 1896.

DEAR DR. SIMPSON,—I am unable to comply with your request that I should give you a summary of our vaccination results according to the scheme sent by you. The number of incisions which must be made in Germany in the case of a child vaccinated for the first time is from six to ten, and in a revaccinated person from five to eight. Vaccination in one, two, three, or four places do not occur here. In the course of the present year, for the first time, the minimum number of incisions was fixed at four, and the results for this year will be tabulated for the first time in December. Only then shall I be able to send you reports as to the successful vaccinations in general. In Berlin and the province Brandenburg the successful first vaccinations amount to 95·24 per cent., and of revaccinations in children to 87·22 per cent. For military vaccinations our Institute has not in recent years sent out any lymph, I can therefore only give you information as to the results of other institutes. With the lymph supplied by the Königsberg Institute there were in the past year 46·19 per cent. and with that from the Stettin Institute 50·84 per cent. of successful results in the military revaccinations. The instructions as to the obtaining and distribution of the lymph will be found in my book on page 91.—I am, etc.,

Dr. M. Schurz.

The effect of the system is seen in the table comparing the prevalence of smallpox before and after its introduction into Prussia, and by a further comparison between the prevalence of small-pox in Prussia with such a system and in Austria with no compulsory vaccination.

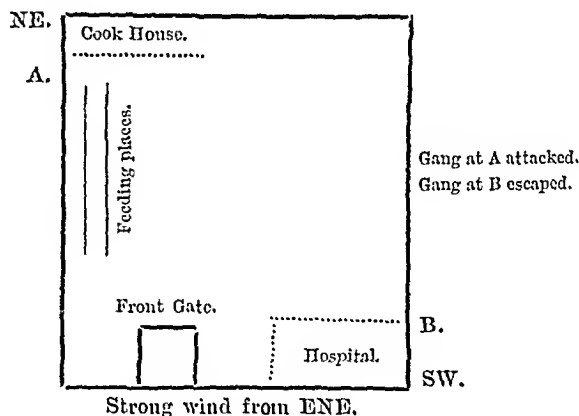
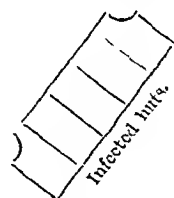
CHOLERA DIFFUSION BY FLIES.

BY SURGN.-CAPT. W. J. BUCHANAN, M.B., D.P.H.

THE following account of an outbreak of cholera in the jail at Burdwan in June 1896 (which is published with the permission of Dr. W. H. Gregg, who recorded the facts) is of interest in connection with the spread of that disease by other means than by water.

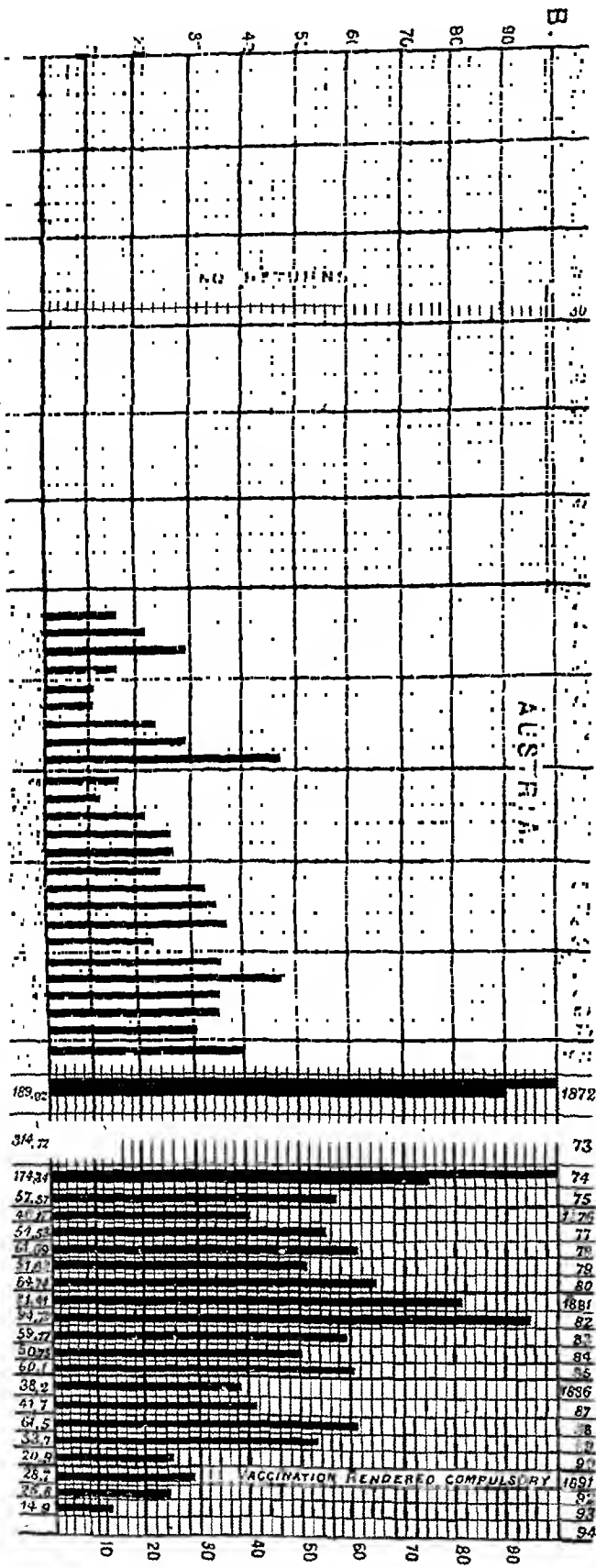
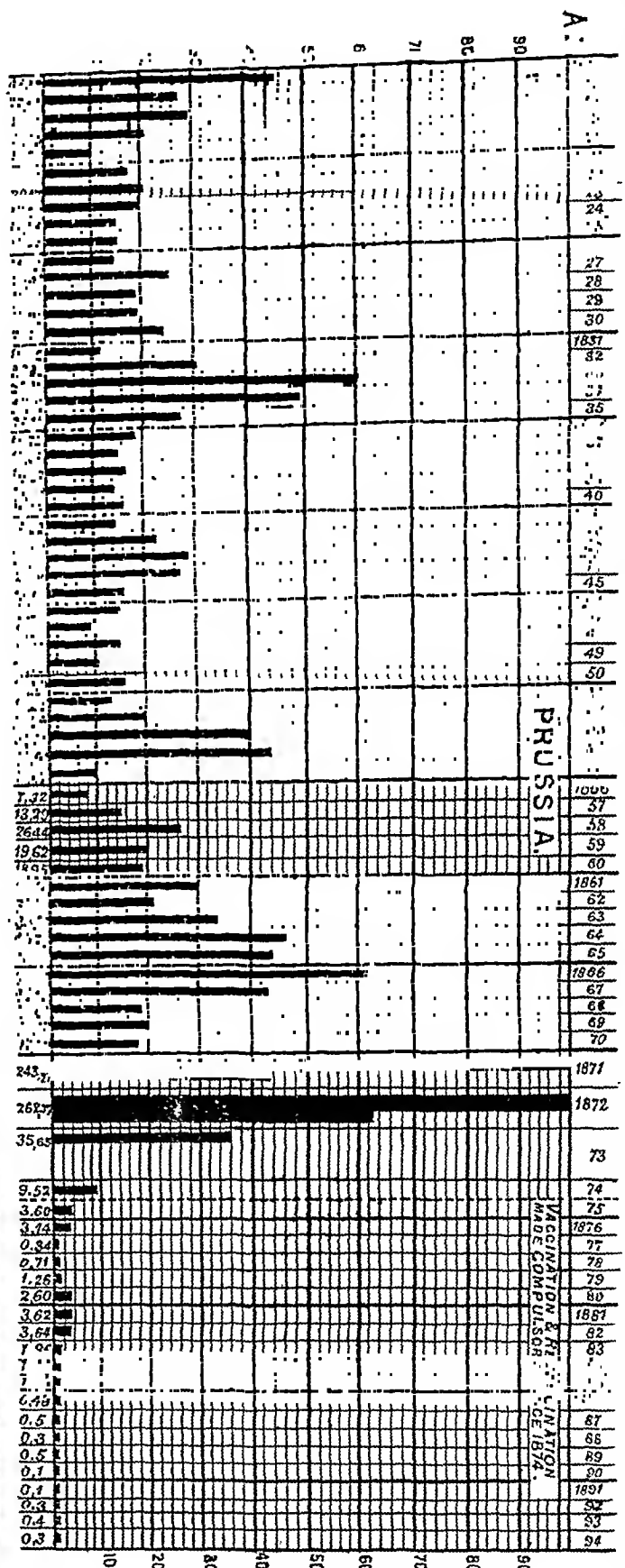
On June 5th a young prisoner, sleeping in No. 3 ward, over two months in jail, was attacked with cholera and recovered; on 7th June six fresh cases occurred, two of which were fatal. These six men came from sleeping wards as follows: two from No. 3 ward, two from No. 5 ward, one from No. 2 ward, and one from No. 4 ward (all these are built in one row). On 10th June another case occurred from No. 2 ward, and next day (11th June) the last case occurred from No. 6 ward, which was also fatal. Therefore nine cases of cholera, four of which were fatal, came from six different sleeping wards. All these prisoners had been over one month in jail, except the second case who had been only 7 days in jail and the fifth who had been 12 days in jail (both these cases recovered). There was no prevalence of diarrhoea, before, during or after the outbreak, in fact, the jail was at that time exceptionally free from bowel-complaints. The water-supply was practically above suspi-

cion. It is taken from the Municipal water-works and brought in pipes direct to the jail. The filtration I have proved by bacteriological examination to be effective. The milk was also free from suspicion, as all milch cows are kept within the jail walls, and the milk is boiled before issue; besides the prisoners who were attacked got no milk. How then did the disease find an entrance into the jail? The second case who was attacked on his seventh day of residence in the jail might be suspected, but the first case occurred two days before his attack. The female prisoners were not attacked, nor were the under-trials, nor the hospital patients, nor the jail, nor warder staff, nor any attendants upon the sick. The infirm gang also was not attacked. This is important. At this time the male convict population was 190, and was divided into two separate sets, viz., ordinary prisoners 100 and infirm gang and sick 90; these latter with the females, who live near the hospital, were also about 100 in number. The men in the "infirm gang" worked and slept in association with the ordinary prisoners, and received the same water-supply. They were, however, *fed separately and their food cooked separately*. Owing to the large number of men in poor health in the jail, Dr. Gregg had separated all the weakly into one large gang, and the food and special diets for these men (forming fully one-half of the jail population) was cooked and served out to the prisoners in the hospital compound. The ordinary prisoners (to the same number) were fed and had their food cooked at the extreme opposite (diagonally) corner from the hospital. At this N.-E.



corner outside the jail walls there is a deserted compound and a row of dirty huts belonging to the public. This dirty corner had been animadverted upon by the Jail Committee in 1895. Here at the time of the jail outbreak of cholera there had been several fatal cases of this disease,

DIAGRAM SHOWING THE NUMBER OF DEATHS FROM SMALLPOX IN PRUSSIA, AND AUSTRIA IN THE YEARS 1816 TO 1894 FOR EACH 100,000 LIVING.



and we may safely presume that their infectious excreta were not disinfected.

At the opposite or hospital corner of the jail where the other half of the convicts fed there is outside a jail tank and garden both clean. Therefore we have two equally large gangs of prisoners with the same water-supply, but the food was cooked and eaten separately; one gang is severely attacked which fed in the corner near the infected huts; the other gang at the opposite corner of the jail entirely escaped.

At this time the city of Burdwan, and especially the railway yard, was inflicted with swarms of flies, more even than is usual in India in the hot weather. Dr. Gregg considers it probable that on the 4th June, *while a strong E. N.-E. wind was blowing*, swarms of flies were blown from the infected huts, and on reaching the trees and corner of the high jail wall they obtained shelter from the storm and settled on the food exposed in plates before the gang of prisoners feeding at this corner. It is certain that the affected prisoners all fed at this point, for on recovery the survivors pointed out the exact places where they had their evening meal on that day, 4th June.

This case is therefore one of strong presumptive evidence in favour of the flies having spread the disease.

Supposing the infection to have been brought inside the jail on the occasion of this storm on the 4th June, we have the following periods of incubation of the disease: one case 24 to 36 hours, six cases 3—4 days, one case 6 days, and one case 7 days. The fatal cases all ran a very rapid course, sinking in a few hours. Macnamara (*apud* Quain) puts the incubation period of cholera as "within five days." In Notter and Frith's Hygiene (p. 602) it is given as "from a few hours to 3 days, though it may apparently reach as much as ten days." In Macnamara's well-known case the five men who drank the polluted water were attacked "within 36 hours."

The above cases though wanting the bacteriological proof as in Dr. Macrae's now classic case in Gya Jail in 1894, is yet deserving of publication as affording evidence of the possibility of flies conveying the disease from place to place, especially as now-a-days some writers are apt in their adherence to the water-borne theory of the disease to overlook the fact that cholera may also be spread in other ways.

THE EPIDEMIC OF BUBONIC PLAGUE IN HONGKONG, 1894.

By JAMES A. LOWSON, M.B.,

Medical Officer in charge of Epidemic Hospital.

(Concluded from page 59.)

ALICE MEMORIAL BRANCH HOSPITAL.

Total. Plague. Observation. Deaths.

June and July ... 112 110 2 93

In the *Glassworks and Slaughter House Hospitals* under Chinese treatment the following were

the numbers. These are given in a somewhat different manner, but I believe the figures are correct:—

Admitted living	...	...	...	1,627
Admitted dead	...	...	...	828
Sent to Canton	...	...	...	194
Sent to Kennedytown and Alice Memorial Branch Hospital up to 31st July	...	...	...	26
Sent to Lai-Chi-Kok	...	...	...	13
Under observation	...	...	...	69
To Kennedytown in August	...	...	...	11
Plague cured	...	...	...	74
Deaths from plague	...	...	...	2,068
			2,455	2,455

In addition to these there were treated in the Government Civil Hospital Isolation Wards 32, of which—

7	...	...	Died.
6	...	...	Transferred to Hygeia.
19	...	...	Transferred to Kennedytown.

The following table gives the numbers of different nationalities who were affected and died, with the percentage of deaths. This, of course, is only as far as hospital statistics go; the number of dead bodies found in town and sent straight to the burial-ground is not included here:—

	Affected.	Died.	Mortality per cent.
Europeans	... 11	2	18.2
Japanese	... 10	6	60.
Manilamen	... 1	1	100.
Eurasians	... 3	3	100.
Indians	... 13	10	77.
Portuguese	... 18	12	66.
Malays	... 3	3	100.
West Indians	... 1	1	100.
Chinese	... 2,619	2,447	93.4

The Chinese figures are difficult to work out, owing to so many removals having taken place. The above are the numbers where definite results as to recovery or death are known.

Of the 1,627 persons admitted to the Slaughter House Hospital alive, 1,037 were males and 590 females. Of the 828 bodies brought in dead, 472 were males and 356 females. Considering the comparative smallness of the Chinese female population it will be seen that they suffered severely. By last census the proportion of females to males was only 23.57. This heavier female mortality was only to be expected when it is remembered that women and children were practically confined to the houses in the infected areas every hour of the twenty-four, whilst the men were generally absent during the day, and in many cases slept in the streets at night—a thing which the women, as a rule, are not accustomed to do.

Out of the 2,619 Chinese cases we had reliable information as to age in 2,050 instances. The following table gives the numbers of those affected in the different decades of life:—

	Males.	Females.
Under 5 years	... 18	27
Between 5 and 10 years...	... 65	73
" 10 " 20 " ...	... 281	190
" 20 " 30 " ...	... 244	84
" 30 " 40 " ...	... 323	75

		Males.	Females.
Between 40 and 50 years...	...	233	74
" 50 " 60 " ...	...	127	86
" 60 " 70 " ...	...	56	49
Over 70 years " ...	...	21	24

Here again the mortality is somewhat difficult to give correctly on account of the removal of the patients to Canton and owing to other reasons.

TIME OF OUTBREAK.

The question as to when the epidemic started in Hongkong cannot be satisfactorily settled now.

The statements made in certain medical quarters here that the plague was raging in Hongkong early in April cannot be entertained by any thoughtful person who has taken the trouble to study the question. The evidence, on which these conclusions were based, was obtained from Chinamen, who are notoriously deficient in the art of truthful description, and its value is further discounted by the fact that it was freely stated that the disease had been here either "for years" or "as long as could be remembered." Add to this that these statements were only made after the epidemic had been raging for some time, when every Chinamen was wildly excited, and I think it will be conceded that no credence can be put on such statements.

Personally I believe that the first deaths took place in the early days of May. The mortality statistics cannot be depended on in this Colony as far as the proper registration of the *cause of death* is concerned, but the *number of deaths* given by the Registrar-General may be looked upon as not far wide of the mark. These numbers were as follows from the 1st April till 9th May, Chinese only in this list:—

April 1st ... 7	April 14th ... 9	April 27th ... 12
" 2nd ... 16	" 15th ... 9	" 28th ... 18
" 3rd ... 10	" 16th ... 9	" 29th ... 12
" 4th ... 9	" 17th ... 13	" 30th ... 11
" 5th ... 10	" 18th ... 13	May 1st ... 8
" 6th ... 8	" 19th ... 14	" 2nd ... 9
" 7th ... 8	" 20th ... 11	" 3rd ... 21
" 8th ... 14	" 21st ... 8	" 4th ... 15
" 9th ... 12	" 22nd ... 11	" 5th ... 17
" 10th ... 8	" 23rd ... 18	" 6th ... 13
" 11th ... 14	" 24th ... 8	" 7th ... 18
" 12th ... 14	" 25th ... 8	" 8th ... 24
" 13th ... 14	" 26th ... 17	" 9th ... 27

These figures are significant. From the 3rd to the 9th May the average daily number of deaths had risen somewhat, but to nothing like the numbers which occurred afterwards. Moreover, the number of Chinese burials during the first week of May was not excessive, and did not show any evidence pointing to an earlier period of outbreak. If people had been dying in great numbers their bodies must have either been buried, or remained in the houses; and it was noticeable that scarcely a single body found by the search parties was in an advanced stage of decomposition.

We know that plague corpses decompose rapidly, more especially in the hot weather, so that the evidence given above, although not conclusive, is about as nearly so as it can possibly be.

QUESTION OF INFECTION OF SOIL.

A great amount of interest has centred round the district known as Taipingshan during the past months. The area* which was walled in was undoubtedly one of the most noticeably infected parts of the City of Victoria, though First, Second, and Third Streets in the Saiyingpun district were equally bad. Much general interest has been taken on this head owing to the resumption of the land by the Government; money matters having entered largely into this question in a purely mercantile community like Hongkong, where anything of a temporary commercial character always commands the greatest attention.

Taipingshan (by this I mean the closed area) was shut up:—

1st. Because it was badly infected.

2nd. Because, in the opinion of the medical officers connected with the plague, the majority—if not all—of the houses were not fit for human habitation at that time.

The first of these reasons needs no further demonstration when it is stated that it was difficult to find a house which had not a case of plague in it, while most of them had more than three cases.

The second cause has been demonstrated in the medical part of this report, and may be briefly summarised thus:—

(a) Filth everywhere, scavenging being conspicuous by its merely nominal presence as far as the front door.

(b) Overcrowding undoubted.

(c) The absence or very meagre provision of light and ventilation in most of the houses.

(d) Basements abutting upon retaining walls and with floor surfaces formed of filthy-sodden soil.

(e) "cocklofts," i.e., mezzanine floors, and enbies which effectually led to overcrowding and prevented the entrance of light and air.

Taipingshan having been shut up, the next thing to be considered was "what is to be done with it?" The Housing Commission, appointed by the Governor to consider ways and means for the housing of the native community during the emergency, took evidence on this matter, the opinions of Drs. Kitasato and Yersin being asked, the possibility of the infection of the soil entering largely into the question.

* About ten acres of the most densely populated part of the city was closed by the Government at the height of the epidemic, all the inhabitants being turned out of their dwellings and housed elsewhere. The streets were walled up, and constables were stationed to prevent ingress to the "forbidden city."

After receiving evidence the decision arrived at was briefly that Taipingshan should be resumed, and should be destroyed, preferably by fire.

Naturally the desire of all medical men is to see a town which is perfect from a sanitarian's point of view, but it is a totally different matter when questions of economy have also to be considered. The fact remains that only a very small portion of the town has been improved, whilst the rest of it—some parts in equally bad sanitary condition at present—has been left *in statu quo*.

I have no hesitation in saying that where a Chinese population has to be dealt with, it will never be possible to keep even a perfectly laid-out city in order, unless the strictest surveillance is kept over the inside of the houses; by this I mean looking after the numbers of inmates, the cleanliness of the houses, and the light and ventilation, drainage, etc.

No evidence was given by the local witnesses regarding the infection of the soil, though some of them expressed their opinions. Dr. Kitasato was asked his opinion on the subject only a few days before he left for Japan. I took him round the streets, and as he had lived with me for a month, I was able to get his opinions and views in a much more satisfactory way than by half-an-hour's writing. Dr. Kitasato's statement as regards infection of the soil was as follows:—

"I examined several times the dust of the floors, and the soil of infected houses with regard to their bacteriological contents, and only once I found in the dust of a house the plague bacillus. In soil taken from a considerable depth it has not been found so far, but these experiments require to be carried further."

It was impossible for him to give a lengthy and careful report on the subject, his report being specially directed at the extremely insanitary condition of some houses. He was astonished at the state of affairs he saw, and although quite ready to help by giving his opinions he did not give a full report on the subject. This meant time, and as he had, what was to him, much more important work on hand, it was not to be expected that he should take a great interest in the matter. His views were those of one who wants to see a sanitary Utopia, and his expressions of opinion were mainly directed against the conditions which allowed such a state of affairs as he found to be brought about. Dr. Kitasato's recommendations with regard to the removal of soil was especially directed at some houses with earthen floors, where the soil had become polluted with filth to an almost incredible extent.

Dr. Yersin's report was given after a few more days' consideration, but even under these circumstances I think he made a mistake. Dr. Kitasato did not state that there *was* plague infection of the soil. Dr. Yersin on the contra-

ry maintained that there was. His opinion was expressed as follows:—

"I have had no difficulty in discovering in the soil of several infected houses a little bacillus identical with regard to aspect and the culture of the plague bacillus. The microbe inoculated into animals does not kill the guinea-pig or the mouse; it possesses no virulence. This property does not surprise me, for already for a long time I had begun to separate microbes of different virulence in the buboes, and I have authentic cultivations of plague which kill neither the guinea-pig nor the mouse, like the bacillus in the soil."

This paragraph opens up subjects which would provide material for a lengthy controversy—subjects which call for much discussion and require many proofs.

Now it seemed that if the plague bacilli were found underground after a few short weeks of the outbreak it was a very serious thing to tackle; and to me it was a mystery how they could find their way through tiled floors; even though the tiles might be porous. If the soil was infected, then it was necessary that serious measures should be undertaken; if not, then there was still time by proper means to make any future infection of the soil impossible. As so much hinged on this question, I got Dr. Kitasato's assistant, Dr. Takaki, who had just arrived from Japan, to make an extended series of experiments with me, which effectually proved that there was no infection of the soil. An organism was found which was almost identical with the plague bacillus, but this, on closer examination, was found to be really different, and this view was afterwards borne out by Dr. Kitasato, to whom numerous specimens of earth from the worst houses were sent, and to whom the results of our local experiments were submitted for criticism.

This same organism, closely resembling the plague bacillus, was found in earth taken from the garden of the Government civil hospital. I have not time at present to go into the minute details of the case; suffice it to say that numerous experiments with soil at depths of from one inch to twenty inches were made in the most careful manner, and the results were always the same as regards the absence of the plague bacillus.

The main causes of the spread of the plague were as follows:—

- (1) Want of means for the isolation of people who were almost certainly incubating the disease.
- (2) The grossly insanitary condition of the latrines.
- (3) Overcrowding.
- (4) Want of efficient house scavenging and the filthy habits of the inhabitants.

These were the most potent factors in the spread of the epidemic; and these simple but urgent matters should be put right forthwith. While I write this, the houses in First Street and several other streets not far from the Government civil hospital are in as bad a condition as—if not worse than—they were in April 1894.

PROPHYLACTIC VALUE OF OPIUM.

Several statements were made—probably by interested persons—during the epidemic as to an alleged immunity from the disease acquired by opium smokers. There was no such immunity, as many opium smokers died in the various hospitals. The following extract from a letter to the Colonial Surgeon on this subject, dated 11th August 1894, gives my views upon the subject:—

"In answer to your question I have to state that it is not a fact that 'no opium smoker has died from plague.' Numerous opium smokers and several opium eaters have died during the epidemic. The proportion of opium smokers admitted will never be ascertained, as so many patients arrived at the hospitals delirious or comatose.

"Opium smokers would certainly be less liable to infection than those who do not smoke anything at all, but I am of opinion that in the case of plague smoking good tobacco is of greater benefit than smoking opium. In plague it is the atomised carbon which is of prophylactic value. An opium pipe cannot have the specific effect in prevention of plague that it undoubtedly possesses in malaria.

"After a person has been attacked by plague an opium pipe under judicious medical supervision will undoubtedly act as a sedative in the acute stage; but here again it could not have the wonderful effect as a curative that it often has in malaria, phthisis, and bad neuralgia.

"During convalescence after plague its use is indicated for those who have smoked opium previously and is here of great benefit."

In the case of two opium divans, where careful enquiry was made, I found that no inmate had been attacked by plague, and several customers had made them their residence for some time. Anyone who has been into a busy divan in the city of Victoria knows that the amount of smoke generally evolved by the inmates prevents one seeing across the room. Infection by inoculation is of very frequent occurrence, and I cannot see how opium smoking could possibly prevent infection by this channel unless by physical or chemical action outside the body. An opium smoker may finish his smoke and afterwards go into an adjacent house and be infected with the disease; the pipe he smoked some time before is then of no prophylactic use.

Moreover, the mere fact that these houses were opium divans was not the only reason why they escaped, as each lessee took very good care in

his own interests to keep out any visitors who had any appearance of being sick; and if any one had become ill in the house, it is pretty certain that he would have been very soon turned out of it.

Opium smokers who recovered were not allowed to smoke in the Government hospitals, but from the rapid way that several opium-smoking inmates of the Slaughter House Hospital convalesced when allowed to smoke, I should be disposed in future to allow them to have their usual pipe in some outside ward or mat shed. Several patients were noticed in the native hospitals who smoked through their whole illness, some of their friends attending them to keep the pipe frequently filled, and it must be said that they seemed to give very little trouble, whilst food very rarely crossed their lips.

DRAINAGE STATISTICS.

The following table prepared by Mr. J. R. Crook, Sanitary Surveyor, shews that, in the principal infected areas, houses which were drained under the Public Health Ordinance were affected in fewer numbers than those which were not connected with the new drainage scheme:—

Taipingshan District.

	May.	June.
Houses redrained under Public Health Ordinance	33% affected	30% affected.
Houses not so drained	36% affected	36% affected.

Western District.

	May.	June.	July.
Houses redrained under Public Health Ordinance	10%	17%	2%
Houses not so drained	13%	26%	3½%

These differences are so small that it would be wise not to attach too much importance to them as a proof of the necessity of having efficient drainage.

PRESENT SANITARY REQUIREMENTS.

The following matters require urgent attention:—

(1) *Vital Statistics.*—A reliable record of vital statistics prepared under the immediate supervision of a duly qualified medical practitioner should be at once instituted. Compulsory notification of death is necessary. There is no law at present to enforce it.

(2) *House Drainage.*—Existing regulations should be enforced regarding the design and construction of house drains, and remedial measures for removing existing defects should be put into effect.

(3) *Scavenging.*—Thorough and efficient scavenging of all public and private streets, lanes, alleys, yards and premises throughout the Colony is a great necessity.

(4) *Light and Ventilation.*—The existing laws with regard to light and ventilation require to be enforced, and regulations as to the height of buildings and the width of streets should be introduced. (A new Act has just been made.)

(5) *Basements*.—An enactment prohibiting the occupation of basements as domestic dwellings is very necessary.

(6) *Wells*.—All wells situated within the thickly populated areas of the city and used for dietetic purposes should be closed at once.

(7) *Latrines* should be provided on suitable sites throughout the city and maintained by the authorities in a cleanly condition.

(8) *Insanitary Dwellings*.—The laws relating to insanitary dwellings and the closing of those unfit for human habitation should be enforced.

(9) *Private Lanes and Streets*.—All private lanes and streets should be resumed by the Government and maintained in a proper condition.

(10) Back-to-back houses should be demolished as soon as possible.

(11) *Dairies*.—All dairies should be removed from the crowded districts of the city. This has been pointed out in previous years by the Colonial Veterinary-Surgeon.

(12) *Bakehouses*.—Existing laws and regulations affecting bakehouses require enforcement.

(13) Importation of dead meat from the mainland should be strictly prohibited.

(14) *Importation of Animals*.—Reception lairs should be provided to allow proper inspection of all animals imported into the Colony.

(15) *Markets*.—Several public markets require sanitary improvement, and a market for the wholesale trade in fruit and vegetables should be instituted, and efficient inspection should be carried out. The latter is extremely necessary during the summer season.

(16) Sheep and pigs should not be kept in houses which are inhabited by or are built for the habitation of human beings.

It is a matter for regret that the resumption of Taipingshan should have been carried out before these most necessary sanitary improvements have been effected, which are, I believe, far more necessary than the former. They are the common places of public health, but they require a judicious expenditure of money to carry them out and efficient men to supervise them.

CONCLUSION.

In conclusion I wish on my own behalf to heartily thank those especially associated with me in the medical work, Surgeon-Major James, A.M.S., Surgeon Penny, R.N., Dr. W. F. C. Lowson and Dr. J. F. Molyneux, for the very great assistance they rendered at a critical time. Each had a certain amount of routine work to get through, but where so many developments occurred at all hours of the day and night, a serene temper and a ready obedience to orders were necessary to enable us to get through the work during the early days of the epidemic. These were always forthcoming, and it was only our perfect unanimity which enabled us to do

so much. Surgeon-Major James' duties at the Tung Wah Hospital were as revolting as they well could be; even the dirty work which the officers and men of the Shropshire Regiment had to do was less disgusting.

It is as well to point out that Drs. W. F. C. Lowson and Molyneux were the only volunteers to help us when matters were really serious. We had other volunteers when the heavy part of the fight was over.

The subordinates of the Medical Department I also cordially thank for their splendid conduct, under circumstances trying to the best tempers, and for the implicit confidence they placed in all orders and directions given for their welfare.

VIVISECTION (SO-CALLED): ITS RÔLE IN THE SERVICE OF MAN AND BEAST.

By SURGN.-CAPT. P. HEHIR, M.D., I.M.S.,
Hyderabad, Deccan.

In Hyderabad (Deccan), we have recently been apprised of the fact that the Anti-Vivisection Society had succeeded in enlisting the co-operation, sympathy, and interest of the Imperial Government in this country to the extent of instituting a comprehensive enquiry as to whether there were any local reasons for or against the introduction of the Anti-Vivisection Act into this country. This, interpreted by us as a covert blow at the Hyderabad Chloroform Commission upon which this well-meaning but deluded Society has unsuccessfully attempted to shower ridicule in various ways, even to abstracting and advertising with a morbid pruriency, the most objectionable paragraph in the whole report of the Commission. The paragraph referred to is one describing the experiment of striking the testes of a dog to ascertain the effect on blood pressure of the animal. The experiment was undertaken together with division of the sphincter and tenotomy of internal rectus, &c., to ascertain if such operation affect the action of the heart under chloroform. We therefore consider it to be our imperative duty not only to defend ourselves against the series of attacks that have been made upon us by several members of this Society, but also to demonstrate that in no single instance did we perform an unnecessarily painful operation without previously narcotising or anaesthetising the animal; the perusal of the full report by the unbiassed will show that the investigations we carried out are of enormous benefit to science and to mankind; and that the *primum mobile* of our researches was based on instincts of the highest and most sensitive humanity. We propose in this paper to likewise consider the almost immeasurable extent to which experimental researches on animals has proved of use to man in the most varied way; its beneficial effects are to be seen in almost every phase of civilised life, till by familiarity the fons et origo of practices based on such

research is practically ignored. Lastly, we purpose commenting on the work of some of the leading luminaries and champions of the Anti-Vivisection Society and the devices they employ to arouse, maintain, and stimulate public attention and sympathy.

Indeed, the widespread popularity and sympathy which they have gained, and the interest they have aroused, have been acquired by misrepresentation, utter disregard of facts, and the suppression of an overwhelming amount of evidence which goes dead against them, and which if made common property would effect their entire extinction without any possibility of resuscitation.

In doing so we shall be obliged to expose, refer to a few of their devices, their unscrupulousness, disregard to truth, the manner they suppress evidence of the weightiest kind to prop up their hypotheses; and we shall to a large extent make use of the very arguments they employ against us to reduce to an absurdity the conclusions they arrive at. As the generally acknowledged advantages of experimental research to mankind form the main reason for the continuation of experimental work, we shall deal first with these advantages; and we hope that our illustrations will convince those with open minds on the subject that the mainspring in all instances is a laudable aspiration to find the truth. The facts or data in experimental work arrives but slowly, the progress is tardy, but it is certain, and as each new fact is added, each discovery made, the panorama exposed becomes wider and wider, and the breadth of view proportionately expansive. This is mathematically true as regards physiology and pathology, and almost so in therapeutics.

Suppose we keep a few rabbits in a glass box into which the dust resulting from the dried and pulverised expectoration from cases of phthisis pulmonalis was discharged, we can show how soon they get phthisis. It has been definitely proved that the same experiment may be applied to anthrax, glanders, farey, and other diseases. Now it would be impossible to apply these tests in the human being; and, consequently, if the lower animals are not employed, we should still be groping in the dark regarding some of the most elementary points of physiology and pathology.

There are so many excellent disquisitions, lectures, articles, and brochures extant on the subject of vivisection and its advantages, that one hesitates to add to the number; and were the subject not to materially affect the future of scientific medicine in India, we would abstain from entering into this controversy. There are exceedingly few who have written on the subject as it affects India; indeed, if we exclude the few papers written during the last five years, we find that the literature is a blank.

It seems curious to us that men with such vast reasoning powers should accept such a narrow view of this overwhelmingly important problem, for there is nothing to warrant the sweeping denunciations which they have showered on our profession. As to the uses of experimental recourse the question seems to be reducible to a mathematical certainty, and we who support animal experimentation can deduce conclusions from reliable records and statistics obtained from the accounts of researches carried out by some of the most reliable and accurate observers the world has known, many of which experiments have been supplemented by the use of instruments devised by physicists of world-wide fame.

It is at this late stage of the argument quite impossible to conceive the extraordinary advances that have in the aggregate resulted from experimentation on animals, just as it is impossible to imagine the exact state of knowledge prior to the days of experimental research. It is no exaggeration to state that were our forefathers in medicine to rise from their resting places and get a glimpse of the present state of our knowledge, they would retire back with astonishment and recognise they were not intended to live more, and hence their not being with the present generation.

Let us illustrate this by a few examples. It was at one time shown that overcrowding in the barracks of the soldier and in the stables of our cavalry horses give rise to an excessively high death-rate from phthisis pulmonalis ('consumption'), a death-rate of about 9 per mille. The reason was found to be the foul and specifically contaminated air which was being constantly breathed and re-breathed by the men and horses. After the publication of the report of the Royal Commission on Barracks in 1862, a larger cubic space with better provision for ventilation was introduced, and the disease underwent enormous reduction. Vielleman had previously proved that the air of rooms inhabited by cases of phthisis was capable of communicating the disease to animals. Shortly after Koch in January 1882 discovered the *bacillus tuberculosis*, it was found possible to communicate the disease to different animals by retaining them in a confined cage and forcing in a quantity of air laden with this bacillus.

It is often forgotten that the lower animals are benefited as much as man by the results which are deduced from these experiments.

It is now a well known fact that, in the absence of experimentation by inoculation on lower animals, it is absolutely impossible to prove that any particular micro-organism or bacteria is the cause of any disease. To prove that a particular germ is the *fons et origo malorum*, it is necessary to get an affirmative demonstration to each one of what are known as Koch's

pustulates, which we need not here recite. My personal belief is that in future years the tendency will be to remove restrictions on those branches of physiological science which are conducted through the medium of lower animals, and which have hitherto so considerably hampered the advance of scientific investigation in medicine. We are acquainted with many young and middle-aged men in England who, but for the cumbersome routine of obtaining licenses, would have become men of note in science.

The foregoing remark gives only one particular method or system of applying the experimental research on lower animals, whereas there are at least a dozen other branches of our comprehensive professional calling which tend themselves to this form of enquiry.

The practical value of experiment on animals is seen to be carried into circumstances of every-day life, both of health and disease. The subject of the effects and uses of the foods we eat, and the beverages we drink, have all been worked out on animals, and yielded the vast storehouse of knowledge embraced in the subjects of physiology, hygiene and pathology, whether we deal with the subject in its general relations to the healing art, or its connections with any one branch of medicine.

This practice has at times been carried out to an extent which has justly been deemed criminal, and in a few instances the perpetrators have been made to suffer for the folly of their experiments.

A few years ago a French medico wishing to test the accuracy of the statement that cancer was infective, inoculated the unfortunate woman who was already a victim to this dire malady by placing bits of the cancer material in various parts of the body beneath the skin. Within six months the woman was one horrible mass of multiple cancer and suffered the greatest possible agonies therefrom. The result was that whilst he proved his thesis he was imprisoned for 12 months with hard labour, besides depriving him of his medical diploma. About a year ago also there appeared an article in the *London Times*, written by its Berlin correspondent, declaring that Drs. Hohn and Bergmann, both surgeons of the greatest eminence in Germany, were charged with inoculating patients in the hospital at Friedrichshagen with cancer lymph, and did not deny the indictment. Their plea was that in every case they experimented on the patient was beyond all hope of recovery, and that it was necessary to select human beings for these purposes, as none of the lower animals were suitable. As no untoward results could be shown to have resulted, no punishment was inflicted on these surgeons, but there can be but one opinion as to the justifiability of such experiments. This is carrying experimental research beyond the limits of discretion, and there is no doubt but that in England such

cases if brought up for prosecution would fare much worse than did our distinguished *confrères*.

Not one patient in hundred would, we believe, consent to have his dissolution accelerated in the cause of science. When patients seek treatment in a public hospital they do so for personal relief, without any consideration whether their illness or treatment is to be made a source of benefit to others. In private practice it would be a most reprehensible custom to adopt, but in public hospitals where patients are expected to observe all rules and regulations, and yield explicit obedience to the physician or surgeon, without having the power to object, it is even worse. Were such practices permitted generally, public hospitals would be a source of great dread to the sick instead of being institutions for the relief of suffering.

Since the publication of the report of the Second Hyderabad Chloroform Commission, we might say since that of the First Commission, the literature of the chloroform question has multiplied enormously, so that at the present day a mere reprint of all that has been recorded regarding its work would fill two large royal quarto volumes. Indeed, so many and so conflicting have been the views advanced on the subject of the proper method of administering chloroform, that it might safely be declared that, with the exception of those specially interested in the matter, no member of the profession could give a clear and succinct account of the views advocated by the Hyderabad Chloroform Commission. These have been secured by the introduction of a multiplicity of side issues and apparently irrelevant facts, so much so indeed, that the main points and issues of the Hyderabad Chloroform Commission's work have been lost sight of.

They come in as a grand record of work, supplying a mass of details that have never before in the history of man been gathered. They are a monument of industry. They are no fictions. They are a simple record of daily observations. They say what could have been done years ago if there existed an earnest, ardent endeavour to ascertain the truth.

The two facts that were originally insisted upon are:—(1) that in chloroform administration it is only necessary to watch the respiration; and (2) it is unnecessary to watch the pulse and heart. Whenever an accident from chloroform arises, it is due to one of two causes, overdosing or asphyxia.

The hundreds of little points brought out in these records all tend to support the statements of the Commission. I have heard many statements that it is impossible to go on doing this; yet we have done it uninterruptedly for a period of three years.

Some of the arguments have been such as to surprise us that at this the end of the 19th

century such absurd and ridiculous views could be advanced.

We have purposely omitted all mention of ether administration except for purposes of comparison for the simple reason that ether cannot be used in this country with the ease and freedom from danger that chloroform is; neither can the various mixtures of alcohol, ether, and chloroform, now so much recommended, be employed.

The past year, like several of its predecessors, has given us a large amount of both clinical and experimental research concerning the action of chloroform, and it is hoped that the results reached may to some extent at least be considered final.

There seems to be no doubt that the dominant effect of chloroform when given by inhalation is to produce vaso-motor depression, followed in turn by depression of the respiration and heart. Further than this it seems proven that it is practically impossible to produce anaesthesia by chloroform without depressing the blood pressure. For this reason the use of atropine before chloroform is used is of value, not so much for any effect it may have on the heart on the vagus-nerves, as for the influence of the belladonna in preventing dangerous vaso-motor depression. It seems to be definitely settled, too, that while chloroform does have a tendency to act as a circulatory depressant, its chief source of danger lies in the respiratory apparatus, and that respiration is the function to watch during the use of the drug since this vital function is the first to be disturbed, and its disturbance at once varies the amount of the drug absorbed. The fact is that before enough chloroform can be given to seriously affect the heart, the respiratory function shows signs of disorder, which, if ignored, and the use of the drug persisted in, may result in cardiac arrest. The inhalation should be stopped until respiration becomes regular, both as regards depth and rhythm.

There are undoubtedly cases in which sudden unannounced death takes place, and we may even admit that there are actually cases of death beginning at the heart, but they are very rare and cannot be avoided, and would in all probability have occurred in the presence of any disturbing factor, such as nervous shock or sudden exertion. One thing becomes plainer each year, *viz.*, that chloroform as at present given is somewhat risky, while the patient is in the hands of the surgeon; on the other hand, the deaths due to ether from anuria, pulmonary disorder, and vomiting after the patient is put back to bed, if recorded and properly credited to this drug, might prove chloroform to be the least mortal of these two drugs. A great deal of unnecessary and acrimonious correspondence has been carried on in regard to the work of the Hyderabad Chloroform Commission. No effort has been spared to ridicule its work, nor have there been wanting on the part of the

anti-vivisectionist attempts to reduce the importance of the discoveries made to man, and to rob earnest workers of their well-earned credit.

As President of the First Chloroform Commission and Pathologist of the Second, I am in a position to express an opinion as to the conditions under which the work was done. During the sittings of the First Commission, work which was carried out in the verandah of the Residency Hospital where the thermometer stood at from 104°F. to 108°F., neither myself nor my friends and colleagues, Surgeon A. Chamarette, of the H. H. the Nizam's Regular Troops, and the late Dr. J. A. Kelly, F.C.S., were able to get leave for the unhampered conduct of the work which we carried out during our moments of leisure under a burning sun. During the sittings of the Second Commission again neither Surgeon-Colonel Lawrie nor myself were able to get relieved from our ordinary duties which had to be carried out as if no Commission was working.

It is a phenomenal fact that, although the investigation of the Hyderabad Chloroform Commission form a group of experiments which exceed in importance practically any group ever conducted or perhaps ever to be conducted, yet no one has as yet systematically gone through the recorded results of these observations. True it is that a report was issued on the subject by Drs. Gaskell and Ghose, yet the value of the report was marked by several circumstances, the chief of which was that the authors began with a sound and a firm conviction that chloroform acted directly on the heart; and that most deaths were due to this fact. Again, the cross-circulation experiments by which they declared this was proved were so thoroughly abnormal and had such an extraordinary effect on the circulation of both animals operated on that the results carried out could not be relied on.

It is often stated that the work of the Commission was supererogatory, and that such information as it proved was known before. Only those who have a very specious acquaintance with the facts can make such random statements. Let us recall the actual position of things before this work was published. Every medical paper we took up declared that one or more deaths had occurred from chloroform administration. Yet no one actually knew the cause of those deaths. Some stated they were due to over-dosing, others to asphyxia, the greatest number to heart failure. With all this mortality and uncertainty can it be stated that an enquiry was unnecessary?

It was most urgently required. Whether we previously possessed the knowledge or not is a matter of fact about which there can be no doubt in the minds of those who knew the actual scope of the Commission's work. We make bold to state, however, that there are scarcely a dozen people who even at this late

period do know what the real nature of its investigations were, or the actual amount of work the Commission did.

It may be a surprise to certain people to learn that there is a storehouse of physiological knowledge in the work of the Commission apart from the question of anæsthetics altogether. This no one has as yet perhaps thought of, but that does not lessen their importance when they come to be thoroughly reviewed. When at some future date a talented physiologist happens to come across the complete report and chart, he will make such use of it as will surprise the scientific world. Fortunately for the reputation of the Commission, the tracings are indelible, and remain as a permanent record of a work such as the world has never seen before, and is not likely to duplicate for many years to come to bring out the results these charts call for the undivided and uninterrupted attention of a specialist, for at least a whole year to be properly comprehended and interpreted. Up to the present time, no one can pretend to have given all the charts and the data connected with them the attention they deserve. Yet until such work is undertaken, we personally will turn a deaf ear to all statements purporting to comment on the work of the Commission, whilst any criticism denouncing the whole of the work of the Commission based on a scrutiny of a few of the charts is as unfair as it is illogical and unscientific.

Nothing that has been hitherto done has been sufficiently convincing to cause the Commission to in any way modify their two main principles, (1) that chloroform does not act directly on the heart; and (2) that in chloroformisation, respiration ceases before the heart.

There is one very evident fact brought out by the work of the Commission, and that is, that the administration of chloroform can never be carried out except with the utmost caution and watchfulness, and that hitherto there has been a reprehensible amount of slipshodness in its use which the seriousness of the task does not warrant. The Chloroform Commission has shown that the administration of chloroform is a matter requiring skill and care, and that the absence of these places the lives of the patients in danger.

Indeed, all those who have taken part in the discussion concerning the work of the Commission have shown an antipathy, animus, and bias, which is far from creditable to men claiming to be numbered amongst scientific reasoners. In their eagerness to denounce the work conducted in a place like Hyderabad, they have been carried away to an extent which the future will show, as the past has demonstrated that they have been acting under a feeling of partisanship which is quite anti-English.

Besides these, there are several other parts which could be elucidated and made known. Indeed, we believe that the work of the Chloro-

form Commission is as yet unknown, and that a committee, such as that suggested, would only form a very necessary supplement to it. As the matter now stands the work of the Commission has not fulfilled the objects intended; there still remains the two schools which may for argument be called the Edinburgh and London Schools, and opinion still remains divided on the most essential points—the safest way to administer the drug.

The one fact presented is the temporary cessation of the heart's action as a reflex act due to the safeguard action of the vagus-nerve, which by this means under certain circumstances prevented further chloroform being absorbed, is a highly important phenomenon, and accounts for many of the cases of so-called cardiac failure recorded by many junior observers, but wrongly supposed to arise from the cessation of the action of the heart arising from chloroform inhalation. Again it was proved positively that the general practice of injecting ether beneath the skin, when an accident occurs under chloroform, is highly injurious, and accelerates rather than retards death.

The general outcome is that the real work of the Hyderabad Chloroform Commission remains a sealed book to the profession. It is most necessary that the work of the Commission be subjected to a methodical and detailed enquiry by an unbiassed scientific committee, who will interpret the results for the profession and present us with a mass of information.

Apart from the chloroform question itself, there is in the report of the work and in the tracing charts a magazine of physiological and pathological facts which, when systematically investigated and duly interpreted and recorded, would present the profession with one of the most important records of the present century.

When a patient is partly under the influence of chloroform, it frequently happens that all the emotional expressions are preserved, although consciousness is totally abolished; he may cry out or struggle when cut with the knife, and yet when he recovers from the anæsthetic, he will state that he felt nothing whatever of the operation, nor has he any recollection of what he has passed through.

By appropriate stimuli it is possible to elicit in animals deprived of their cerebral hemispheres the outward body manifestations which we usually regard as the expressions of certain emotions. Now an emotion is a psychical state, or state of consciousness; but it is dependent for its production on the existence of certain bodily changes—affections of the heart, vascular system, voluntary muscles, which are involuntary and reflexly produced. The mechanism for this reflex production is present in the lower cerebral centres, so that severe stimulation of a sensory nerve in a hemisphereless rabbit causes it to utter a long, plaintive scream. The brainless frog

responds with a croak, almost indicative of pleasure each time its back is gently stroked. In neither of these, nor in any similar case, however, are we justified in speaking as if an emotional state of consciousness were produced. We have no reason to think that the rabbit suffers from pain, or that the frog is pleased in the two above-mentioned experiments, but merely that certain changes in the bodily condition are reflexly produced, which, if the cerebral hemispheres were present, would be represented in consciousness or as emotion of pain or pleasure.

It was formerly thought that in all their functions the cerebral hemispheres acted as an entity, and that any voluntary movement or any change in the state of consciousness might be considered as carried out by all parts of the hemispheres acting together. During the last twenty years, however, conclusive evidence has been brought forward of the localisation of function in the grey centres of the cerebral cortex. This evidence is physiological and pathological, but in both cases it falls under the head of excitation, or of destruction and consequent paralysis. On exciting certain parts of the cortex, situated in the neighbourhood of the fissure of Rolando, definite co-ordinated movements of certain muscles or groups of muscles are produced, varying in their distribution according to the exact spot stimulated. This stimulation with the faradic or galvanic current of the convolutions at the upper part of the fissure of Rolando causes co-ordinated movements of the lower limb; of the middle part movements of the upper limb; and of the lower part including the third frontal convolution movements of the head and face.

On the inner side of the hemispheres movements of the face, arm, trunk, and leg are represented from before backwards on the marginal convolution. These experiments are corroborated by others in which definite parts of the Rolandic area of the cortex are destroyed. Destruction of any given zone of the motor area produces paralysis of voluntary movement in the part represented by this portion of the cortex. Thus, if on stimulation of a spot near the centre of the fissure of Rolando, we obtain a definite movement of the arm of the opposite side, and we then excise the cortex at this spot, we find that after the operation the animal has lost voluntary power over this movement and over none other.

We were formerly taught that the grey matter was not directly excitable, and that the effects of electric stimuli were due to excitation of the underlying fibres of the *corona radiata*. The direct excitability of the grey matter is, however, proved by the following considerations:—

There is greater loss in time in the grey matter than in the underlying white matter; that is, if we first stimulate the grey matter and then

shave this off and stimulate the white matter below, it is found that the latent period relapsing between the time when the stimulus is sent in and the time at which the contraction takes place is far greater in the former than in the latter case.

(To be continued.)

ENTERIC FEVER IN RANGOON, AND ITS RATIONAL TREATMENT.

By SURGN.-CAPT. A. O. FITZGERALD, A.M.S., *Rangoon*.

It has been asked so often of late why the mortality from enteric fever among British troops serving in India is so great? and so much apprehension appears to exist as to the apparent spread of the disease that, naturally, many have been led to enquire into these matters.

The usual explanation given for the apparent spread is that the disease is better known now, diagnosis more accurate, and that, therefore, many cases are now returned under this heading which formerly would have been considered as of malarial origin. Typho-malarial has been wiped out of the nomenclature, and remittent fever is a comparatively rare disease in hospitals for British troops.

This is quite true, and I think will be found to account for the great bulk of the increase, but it does not appear to have been considered how this might have affected the mortality?

One can easily understand how many cases of true enteric came to be regarded as remittent fever of malarial origin, one frequently meets such cases at the present day. Now, under the old *regime* these would have received gr. 20 of quinine per diem at least, this would have been continued till the temperature became normal, and one did not hear of any excessive mortality. But what has been done of late years? If the temperature has not responded within a few days, it has been looked on as an almost infallible sign that the fever is not malarial, but probably enteric, and the quinine has been discontinued as being of no use in that disease. Some fancy method has been adopted, and the good old treatment of cinchonising the patient as rapidly as possible has been discarded simply because a few doses of quinine did not effect a miracle, and the drug was never continued long enough to show its beneficial effects. In curious contradistinction to the cessation in India we have seen the introduction of the quinine treatment into Germany by Vogel, and its successful continuation by Liebermeister. Again Dr. Burney Yeo recommends the administration to severe cases of as much as gr. 36 per diem, given in conjunction with his chlorine mixture. Others may also use this drug moderately or largely, but any publications of the fact have escaped my notice, and I apologise for any omissions beforehand.

In Rangoon the years 1895 and 1896 appear to be most favourable for comparison, as the conditions were practically similar, though, on the whole, 1896 was a much more unhealthy year (average number constantly sick, 146 against 103 for 1895). The British Infantry Regiments were new to the station in each case, the Worcester Regiment having arrived in October 1894, and the Suffolk Regiment in October 1895, and in each year there had been a severe epidemic of influenza which affected most of the men in each Regiment. I propose, however, to go further back, and give the number of cases and mortality since 1890 :—

1890.			1891.			1892.			1893.			1894.			Jan to Oct. 1895.			Oct. 1895 to Jan. 1897.		
C	D	P	C	D	P	C	D	P	C	D	P	C	D	P	C	D	P	C	D	P
9	5	55.5	2	2	100	4	0	0	13	4	30.7	3	1	33.3	9	5	55.5	21	2	9.5

During 1894 and 1895 the carbolic acid treatment was given full trial. I have not been able to trace the treatment for other years.

Average per cent. of deaths 1890 to 1895 = 45.8. From this it will be seen that the mortality has fallen from an average of 45.8 for 6 years to 9.5 in the period October 1895 to January 1897.

This is striking, but I have to acknowledge that I am fully convinced that, with my present experience, in all human probability, one at least of those two lives would have been saved, if not the two. This brings us to the most important consideration—was this improvement entirely due to the use of quinine? I think largely so, but in all the cases there were other factors of considerable importance, and in two cases I think the favourable result was due to an entirely different cause.

To explain myself I must now give my views on the nature of this disease, gathered almost entirely from clinical observation and *post-mortem* appearances. When I commenced this series of cases I had an idea that the old teaching was most misleading, the name of the disease and the way it was explained, all leading one to the belief that one's attention should be fixed on the intestine as the chief point, and that all other phenomena were merely subsidiary. My experience at this station has enabled me to grasp facts in my past experience, with the result that I am now fully convinced that there could be no greater error than to think that enteric fever begins, ends, and can only be treated in the intestine.

To my mind it is, from start to finish, a disease of the blood, leading at once to temporary interference with the circulation, to serious interference with the nutrition of the body, and eventually, if not checked, to permanent, or fatal, interference with the circulation. The heart probably being the primary organ affected, and that, not as hitherto taught, through the muscular tissue, but by thrombosis, the formation of clot in the right ventricle and auricle,

which in the early stage merely leads to excited action, insufficient oxidation of the blood, and overloading of the venous system, but later on to excessive accumulation in the blood of carbon dioxide and other impurities, venous stasis followed by effusions, &c., and finally, if the patient has not succumbed to the effects of these, and the insufficient supply of arterial blood, to complete or practically complete blocking of the circulation through the right side of the heart, and death. The muscular tissue of the heart being only affected as other tissues, in proportion to the extent of the thrombosis and consequent impurity and deficiency of the blood supply, plus the extra work thrown on it by this condition, the so-called specific lesions of the intestine being no more an essential of the disease than bedsores are, but which will occur if the patient is allowed to linger on sufficiently long without relief.

Believing then that the condition of the blood was due to the presence in it of specific bacilli, and that the disease should be attacked there, saturation by quinine presented itself to me as being a rapid and safe method, and I decided to use that, and nothing else, as a bactericide. Quiniae sulph. gr. iv in solution was given every three hours night and day and continued until the temperature was normal for three days. If it caused vomiting M. I. ac. hydrocyan dil. was added to each dose. In my two last cases gr. iv was given every two hours, with, I think, better results.

(To be continued.)

A Mirror of Hospital Practice.

CHRONIC EXTRA-DURAL CEREBRAL ABSCCESS—OPERATION: RECOVERY.

By SURGN.-CAPT. A. W. T. BUIST, M.B., C.M. (EDIN.), I.M.S.

A NATIVE boy named Bhola was admitted into the Ferozepore City Hospital complaining of frequent epileptic convulsive seizures, and frequent severe and more or less constant headache.

There was a small granulating ulcer over his left parietal eminence.


History.—The ulcer and above symptoms have existed ever since a *lathi* blow on the head, which he received eight years previously. The patient and his friends were quite definite about the history, and there had been no other injury, &c., to account for the boy's condition. They had noticed also that the fits occurred when the discharge from the wound stopped; and also, on these occasions, the boy himself stated that his headaches became more severe.

On carefully probing the ulcer, a minute hole was discovered in the skull, through which the probe passed for about two inches into the cranial cavity. On withdrawing the probe, pus welled up along the course of withdrawal drop.

by drop, especially when the sinus was made the most dependent part of the head.

Diagnosis.—From the above symptoms and signs, an intra-cranial abscess was diagnosed.

The day before operation, while the ulcer was being dressed, the boy, who had complained of headache all that morning, said he felt faint, and went out into the hospital verandah. The dresser followed him and gave me a clear account of a convulsive fit, beginning first on the side opposite to the lesion, and afterwards becoming general. During this seizure the dresser said that several drachms of pus escaped from the ulcer, after which the boy speedily recovered.

Operation.—On 8th October 1896, I made a modified crucial incision thus  through the ulcer with the sinus in the bone in its centre. This sinus on exposure was found so small that it would not admit an ordinary round director—only a probe. A trephine circle of bone including the sinus was removed, and immediately about 3oz. (at a rough estimate) of very fetid pus escaped with a gush. The bone removed was afterwards found to be much thickened from chronic osteitis, and as there was no diploë in it, its section and removal was a very tedious matter. (The trephine circle at one side measured half an inch thick, and at the opposite side three-eighths thick.)

Extent of abscess cavity.—On introducing my forefinger into the cranial cavity, I could not reach the posterior (occipital) margin of the abscess, and my finger passed upwards and downwards to two joints (about 2") and forwards not at all. Free oozing from the abscess wall obscured any view of its interior and lining membrane.

Just before closing the wound, I again tried to define the posterior boundary of the abscess, and found that the brain, now relieved from pressure, had expanded so rapidly that I could only introduce my forefinger up to the second joint (between first and second phalanges).

The granulating edges of the ulcer were freely scraped with a sharp spoon and the wound sutured, after the insertion of a drainage tube into the abscess cavity, which had been freely irrigated.

All antiseptic precautions were observed during the operation; and, previous to it, the scalp had been shaved, scrubbed with soap and warm water and turpentine, and dressed antiseptically.

Progress.—The after history was uneventful. The scalp wound healed well, and the tube was kept in until it was pushed out by the expanding brain. This final obliteration of the abscess cavity was somewhat slow, probably on account of the bony calvarium forming one rigid wall of it, and therefore the contraction, which helps an ordinary abscess to close, did not come into play here, and the expansion of the brain alone had to effect a cure.

Note on 27th November says:—"No headache or fits since the operation." The boy has gained health and weight, no doubt partly from the cure of his primary symptoms, but also from removal of the fetid abscess which must have been a source of chronic blood-poisoning.

There were never any eye-symptoms or signs of any defects of vision, although the left eye (side of lesion) was noticed to be distinctly more prominent than the right. No change in the latter took place after operation.

Remarks.—The boy probably eight years ago sustained a compound fracture of the skull from a *lathi* blow, with separation of the dura mater from the bone and subsequent extra-dural abscess formation. The pin-hole in the skull-cap acted as a safety valve, so that when it became temporarily obstructed or closed, his headaches became severe, and he got epileptic fits. The chronicity of the case is interesting, and when I left Ferozepore in the middle of December the sinus had almost closed, and the boy was walking about and saying he felt quite well.

A SUCCESSFUL CASE OF OVARIOTOMY.

BY ASSISTANT-SURGEON D. RAHMAN, M.B.,

Russa Hospital, 24-Pergunnahs.

GOLAB, Hindu female, *æt.* 30, Nullipara, was admitted in the Russa Hospital on the 19th January 1897 for the treatment of a solid ovarian tumour.

Previous history.—About five months ago she noticed a small hard swelling in the lower part of the abdomen which used to roll about from side to side. This rolling about caused her a great deal of uneasiness and discomfort, and was, at times attended with shooting pains in the lumbar and hypogastric regions. The swelling gradually went on increasing in size; but since the last three months its growth has been very rapid and accompanied with troublesome nausea and vomiting. Since about a month past she has been hardly able to retain any food.

Menstrual discharge used to be very copious before, but it became scanty after the appearance of the swelling, and since the last three months has stopped altogether.

Condition on admission.—Patient lean and weak. There is a hard moveable tumour in the lower part of the abdominal cavity about the size of a foetal head. Uterus free, length of cavity normal, left ovary can be felt in its normal place, right ovary cannot be felt *per vaginam*. Slight purulent discharge from vagina, abdomen soft and lax; no other organic disease.

Operation.—On the 20th January an operation for the removal of the tumour was performed with careful antiseptic precautions. An incision about 3" long was made in the middle line of abdomen about 1½" above the pubes. On opening the abdomen the omentum and some coils of small intestine presented themselves

which were pushed upwards. The hand being then introduced into the abdomen, the tumour was seized and attempted to be brought out through the incision; but this could not be done until the incision had been extended to about $4\frac{1}{2}$ ". The tumour was then pulled out of the abdomen, and its pedicle, which was found to be connected with the right side of the uterus, was transfixed centrally with a double silk ligature and tied in equal halves; then another single loop of silk was tied firmly round it about $\frac{1}{2}$ " behind this. The peritoneal cavity was then sponged out, and the abdominal wound closed with five deep silk sutures passing through all the layers of the abdominal wall and some superficial horse-hair sutures. The wound was then dressed with iodoform and alembroth-wool.

Subsequent progress.—The patient became very restless after the operation and had troublesome vomiting. A hypodermic injection of $\frac{1}{2}$ gr. of morphia was administered 1 hour after operation, and another of 1 gr. after four hours, evening temperature 99°F .; became quieter during the night and slept off and on.

Vomiting continued to be very troublesome till the 5th day after operation. All this time she was kept under the influence of morphia and fed entirely by nutrient enemata of beeftea. The temperature rose to 100°F . in the afternoon of the 2nd and 3rd days after operation, but after that it remained normal throughout. On the 6th day the bowels, which had been confined up to this, were relieved by an enema, and after that small quantities of milk and soda were retained by the mouth. The dressings were opened on the 8th day, when the wound was found to have healed by first intention. On the 10th day all the stitches were removed, and a light pad of alembroth-wool was only left on.

On the 11th and 12th days she complained of slight pain at the lower part of the wound, and on the 13th day a small quantity of pus was seen oozing out from the lower edge of the dressings. The dressings being opened, it was found that a small abscess had formed at the lower end of the wound, and the wound had gaped a little at this part to give exit to the pus. The opening was slightly enlarged, the pus evacuated, and a thicker layer of antiseptic dressing put on. Eight days later, i.e., on the 21st day after operation, a small slough containing the ligatures that were applied to the pedicle was discharged from the wound. After this the wound healed up rapidly, and the patient was discharged cured on the 21st February.

Evidently the stump of the pedicle which had been left free in the abdominal cavity had become attached to the lower angle of the wound, and the portion of it included between the two ligatures, having its vitality destroyed, had sloughed, and was got rid of by the formation of the abscess. A microscopical examination of the

tumour could not be made, but from its appearance I believe it was a sarcoma.

Medico-Legal.

MEMORANDUM ON THE USE OF A SATURATED SOLUTION OF COMMON SALT AS A PRESERVATIVE FOR VISCERA SENT FOR CHEMICAL EXAMINATION.

By ASST.-SURGN. CHUNI LAL BOSE, M.B., F.C.S.,
Addl. Chemical Examiner to Government, Bengal.

1. In accordance with the Bengal Government Circular letter No. 2792, dated 9th August 1878, human and animal viscera in suspected cases of poisoning are sent for chemical examination ordinarily preserved in spirits of wine; sometimes country liquor is substituted for spirits of wine, but the result is unsatisfactory in such cases for, as a preservative, country liquor is not an efficient substitute for spirits of wine. In a certain number of cases, however, the quantity of alcohol used is insufficient to cover the viscera fully; the exposed parts consequently undergo decomposition to the great inconvenience and risk to health of the officers in the Chemical Examiner's Department who have to work for days with the stinking viscera. The evil may easily be remedied by adding in all cases spirits of wine in sufficient quantity to cover the viscera to about an inch above their upper surface.

2. In cases of suspected alcoholic poisoning, perchloride of mercury in watery solution (1 in 1000) is employed as a preservative where alcohol for obvious reasons cannot be used. Owing to its weak strength, this solution as a preservative is of no value whatever, and the viscera thus preserved are always found to be in an advanced state of decomposition, stinking and disintegrated in shreds. The result of analysis is also unsatisfactory in these cases, as when distilled for extraction of alcohol, certain volatile products of putrefaction come out which either interfere with or simulate some of the chemical reactions of alcohol.

3. The use of perchloride of mercury in strong solution as a preservative is objectionable on the following ground. In cases of alcoholic poisoning, it is always a practice not only to examine the viscera for alcohol, but also for other poisons as well. It not infrequently happens that opium, datura and other poisons are detected in the viscera with or without alcohol in cases where death is reported to have occurred from alcoholic poisoning. Perchloride of mercury has the property of forming with all vegetable alkaloids compounds which are insoluble in water, and when added to viscera in which a vegetable poisonous alkaloid is present, an insoluble compound of the poison with mercury is formed which is not taken up by the water used for the extraction of the alkaloid. The vegetable poison consequently remains undetected.

4. To obviate this difficulty, I have long been on the look-out for a preservative to be used in cases of alcoholic poisoning which will not only keep the viscera in a sound condition but also will not interfere with the extraction and chemical reactions of any poison contained in them.

5. As the result of a number of experiments, I have found out that a saturated solution of common salt is the best substitute for alcohol as a preservative, and that its use is unattended with objections which apply to perchloride of mercury.

6. By placing viscera freshly removed into common salt solution, they were found to keep quite well when examined months afterwards. The tissues showed no signs of decomposition, were intact, and the odour was perfectly sweet if not agreeable.

7. I have found common salt to be not only an antiseptic, preventing putrefaction but also a good deodoriser. When decomposed offensive viscera have been put into common salt solution and examined after a month, not only has putrefaction been checked, but the offensive odour has been found to have disappeared. In this respect common salt acts better than alcohol which arrests putrefaction but has little influence in destroying the offensive odour of tissues already putrefied when put into it. This is a great advantage as it often happens that bodies received for *post-mortem* examination are in an advanced state of decomposition, and the viscera in such cases, although sent preserved in alcohol emit a fearful stink in the subsequent operations of boiling and evaporation required for the extraction of poisons which is prevented by the use of common salt solution.

8. My next attempt was to find out if common salt thus used was prejudicial to the detection of poisons present in the viscera. Theoretically there could be no objection, as common salt has no injurious action on any of the known poisons, and I proceeded to verify this by experiments. I accordingly added small quantities of alcohol, opium, morphia, nux vomica, strychnine, datura, and aconite separately to viscera not contaminated with any poison, and put each separately into common salt solution. After the lapse of a month, I examined them. The viscera in every case kept quite sweet, and the poisons added were successfully extracted from them.

9. The use of common salt as a preservative is not a novel suggestion. From very early times, it has been used to preserve meat and other articles of food. But as a preservative for viscera I remember only one case, during the eleven years that I have been in the laboratory, in which the viscera were sent preserved in common salt solution.

10. The advantages that will accrue from the use of common salt as a preservative for viscera are :—

- (a) It is equal, if not superior, to alcohol in its antiseptic properties, and certainly superior to perchloride of mercury in the strength in which this is ordinarily used.
- (b) As a deodoriser, it is superior to alcohol and perchloride of mercury.
- (c) It would be economical compared with alcohol considering the large number of cases of human and animal viscera that are annually received in the laboratory. The animal viscera are invariably sent in large quantities with a correspondingly large quantity of alcohol as a preservative. In Bengal alone 150 to 200 cattle viscera are annually received for examination, and as about the same number is received by each of the Chemical Examiners in the other four Presidencies, the substitution of common salt for alcohol in these cases will cause a great saving in expenditure.

11. There is one drawback, however, in the use of common salt solution so far as human viscera are concerned, and that is, it forms a crust on the surface of the fluid extract of the viscera retarding evaporation during extraction of vegetable alkaloids by Stas' method. The crust has to be broken up constantly to facilitate evaporation, and this entails extra labour and some delay in the completion of the results. The above objection applies to human viscera only, and is certainly of importance considering the large number of them received annually in the laboratory, as any delay in the submission of the reports is likely to put officers engaged in the inquest to inconvenience. The objection, however, does not apply to cattle viscera, about 80 per cent. of which contain arsenic and require no process of evaporation.

12. Taking into consideration the facts stated above, *common salt* may safely be recommended as a preservative in place of alcohol and perchloride of mercury in the following cases :—

- (a) In all cases of alcoholic poisoning.
- (b) In those suspected cases of human poisoning in which the viscera at the time of *post-mortem* examination are found in a state of putrefaction.
- (c) In all cases of cattle-poisoning.

In all other cases of human poisoning alcohol may with advantage be used as it is at present.

NOTE.—It may not be uninteresting to note that common salt obtained from various places have been examined and found to be free from poisons. As a preservative, a saturated solution of common salt should be used. The solution is prepared by adding cold water to excess of common salt, stirring as long as the water dissolves the salt and filtering the solution through a cotton-wool plug when it is ready for use. The solution keeps well for an indefinite time, and a large quantity may be prepared at a time to save trouble. It is best to put it in stoppered glass bottles. The bottle containing the viscera should be completely filled with the common salt solution.

THE STANDARD.

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DOUGLAS STEWART,

Secretary,

Standard Buildings, Dalhousie Square,

CALCUTTA.

Indian Medical Gazette.

MARCH, 1897.

PRECAUTIONS AGAINST PLAGUE.

NOTWITHSTANDING the efforts that have been made by the authorities on the western side of India, the epidemic of plague has continued to spread in different directions, and wherever the disease has taken root it shews no signs of abatement in virulence. There can be no doubt that Bombay was taken by surprise, and, when it was realized that plague had invaded the city, the desire not to damage the many interests involved, and the mistaken notion that it was a disease of locality and unlikely to spread prevented the authorities, local and imperial, from taking those radical measures which alone could be relied upon to stamp out and check the commencing epidemic. It is gratifying to record that there was one exception amongst those in authority who took a broad and statesmanlike view of the situation and at once advocated measures which, had they been agreed to and carried out, would in all probability have limited the extent of the epidemic. We refer to Sir Alexander Mackenzie, the Lieutenant-Governor of Bengal. His recommendations were made early in October last and recently repeated in his very able speech in Council. And it must be a source of satisfaction to him to find that his recommendations, though tardily accepted, are gradually being introduced.

The gravity of the situation is now beginning to be understood even by the most sceptical, and public alarm has emphasized the necessity for action, and not a moment too soon. The danger is not a local one, and the first consideration of Government should be to protect the unaffected parts of India; for, should the disease succeed in becoming generalized throughout India, it will not

only ruin this country but give such an impetus to the epidemic as to render it a danger to every country in communication with the East. The measures recently taken, though excellent in themselves are hardly, we think, commensurate with the present needs of the situation. The medical inspection of railways, the prohibition of pilgrims from infected areas, quarantine of ships from infected ports, the prevention of the importation by sea of rags, used gunny bags, &c., and the adoption of the policy of segregation camps, are all measures in the right direction, the most important of which we have insisted upon since the disease appeared in Bombay. The passing of the Epidemic Diseases Act gives full power for the carrying out of any measure which may be considered necessary. The time has more than arrived for further stringent precautions, and the Government and Local authorities ought to be in advance of public opinion in these matters. No necessity should arise for an agitation such as occurred in Madras and Calcutta on the pilgrim question. It is a dangerous policy from every point of view to delay effective action until it is actually forced upon the authorities by outside opinion.

Apart from the dangers to which a district or town within a few days' journey from an infected area is subject from omission of the most stringent measures possible to prevent the introduction of the disease, there is the danger of loss of trade by the action of Foreign Governments who are likely to treat India as one infected centre. Unless, then, the infected areas in India are thoroughly isolated and rigorous measures are taken by the authorities to prevent the extension of the disease into those parts of the country which are marked out as uninfected, it is to be feared that a heavy blow will be dealt to the country at large, and Indian ports quite free of infection will be quarantined. This action on the part of Foreign Governments is no doubt unwarrantable, but it is one which must be considered and dealt with. This is no mere supposition. Dr. Brouardel, the sanitary adviser to the French Government, who has much influence in International Councils, has expressed his views very strongly on the subject. It is for the Indian authorities to disarm criticism by shewing that the infected area, which is still extremely small, is, cut off by a rigid system of land quarantine.

including the disinfection and prohibition of certain goods suspected of carrying infection from infected areas. With this done there can be no reason for placing under quarantine any Indian port, except Bombay and Karachi. No doubt, the carrying out of these measures will cost money and give trouble; but whatever it may cost, and whatever trouble it may give, they are insignificant when compared with the loss which would be incurred if Indian ports were placed under stringent quarantine rules by Europe.

LORD SANDHURST'S MEASURES AGAINST PLAGUE.

It is with much pleasure and satisfaction that we publish the letter from Lord Sandhurst, the Governor of Bombay, to Dr. Cowasjee Hormusjee, President of the Municipal Corporation of Bombay, relative to the measures which are to be adopted in that city with reference to the checking and preventing the spread of plague. The views which have been advocated in this journal from the commencement of the outbreak, and which have met with considerable opposition have now been fully accepted in Bombay. Measures confined to cleansing and disinfection have been thoroughly tried and have failed, as we said they would, and now, after a sad experience, measures more adapted to the communicable nature of the disease are to be put into force at once. These are to consist in a systematic enquiry to discover all cases of plague, the provision of hospitals with regard to religion and sex for all who suffer from plague, the removal of the infected to hospitals, and the segregation and observation of all persons in special danger of attack, such as those who have lived in the same room with, or in close attendance on, a plague patient. The measures, we are glad to see, are not to be confined to Bombay City, but are to be carried out wherever plague appears or has appeared, and the efforts are to be widespread, far reaching and systematic. Lord Sandhurst's letter is as follows:—

"DEAR MR. PRESIDENT,—My Government are about to issue a notification under the Epidemic Diseases Act, appointing an Executive Committee to carry out, under orders of Government, all measures within the city of Bombay that we consider necessary to check and prevent the spread of plague. It is my wish that there should be no misunderstanding of the reasons which have led to this course.

The epidemic has now been prevalent for more than five months—since October last. It has been severe during the

past three months; it has been so severe that the total number of deaths has been from three to four times the normal number, and this without making any allowance for the large diminution that we know has taken place in the population of the city. Steps to check the spread of the disease have been taken by the Municipal Commissioner and servants. Your Corporation have worked with an energy and devotion to duty that have commanded our unstinted admiration; the cleansing and disinfecting of the city have been thorough. It is scarcely exaggeration to say that the continued presence of the epidemic in Bombay to its present extent is a conclusive proof that it cannot be kept in check by cleansing and disinfecting, and all other measures that have so far been relied on as sufficient. Other measures are needed. If we cannot summarily kill the plague we can, I am advised and I believe, check the spread and reduce its strength and limit and weaken it till it will die a natural death; but we cannot do this unless we take larger and different measures from those we have hitherto adopted. First of all, it is impossible to deal with this disease unless we know where and to what extent it exists. We must, therefore, search for and discover it. This is merely a matter of enquiry, but the enquiry must be more widespread, more constant, and more systematic than heretofore.

Next, we must provide a sufficient number of hospitals, at convenient places, with every regard to religion and sex for all who suffer from plague. We must ensure the removal to them of all persons so suffering. We must treat them well, and show that the treatment in hospital is the most humane and hopeful course that can be adopted. Those in charge of hospitals will be instructed that, as far as possible and practicable, they should be open to friends and relatives of the patient, who should be encouraged to come and see for themselves that patients are well cared for. I am glad to find that private effort has already provided several hospitals; that is a good and wholesome sign. This is the time when the city needs every help and support that its citizens can give. It is the duty of each one of us by example and persuasion to demonstrate that the treatment of plague patients in hospitals is essential to the welfare of a patient, and to limit the possibilities of spreading the disease. It is a duty, I hope, the Corporation will take upon themselves earnestly and actively. But the requirements of the case do not end with hospitals. If we are really to check this epidemic and to prevent it wandering wherever the chance may take it, we must try to watch in some way all those who are in special danger of being attacked; those, for example, who have lived in the same room with, or in close attendance on, a plague patient. There is danger that such persons may have contracted the disease. We must watch them so that at the first indication of illness patients may be brought under treatment. By this means we shall secure for them the best chance of recovery, and on behalf of others the least scope for infection.

Very briefly put, these are the measures on which I mainly rely for a successful fight against plague. To carry them out most effectively, it is necessary to appoint a small committee, not to consult and advise, but to work—a committee that will divide the whole scheme of work, apportioning certain branches to each member. It is desir-

able to include in this body medical men and engineers, but as the committee is to be a working and not an advising body, it must be as small as possible. We have come to the conclusion that what we need will be secured by a committee of four, and to form that committee we have selected General Gatacre as Chairman, Mr. Snow, Municipal Commissioner; Dr. Dinmock and Mr. James, one of the engineers of the Corporation. They will be subordinate only to Government. This is essential, both because it is Government alone, by exercising the powers very recently conferred under the Epidemic Diseases Act, that can call a committee into being, and for another reason that I will now explain.

Unhappily this epidemic has spread beyond Bombay. It has attacked certain places in the Thana district and Poona severely, and reached to other places. As people move from infected places to others they may take plague with them; its tendency is to spread out. Efforts require to be widespread, far-reaching and systematic. They must, wherever they may be, be directed, controlled and harmonised. We cannot have one practice pursued in Bombay and a materially different one elsewhere. Our methods must be consistent and complete beyond everything. We must, if possible, be successful before the rains.

So, individual efforts, whether of Municipalities, of local boards or of local officers, must take control absolutely into their own hands. To do this is no slur on local bodies; it is no blow to local self-Government; it is simply an imperial necessity.

With the earnest hope that the necessity for the action of Government will be apparent to all and the co-operation of all the citizens of Bombay may be secured."

M. HAFKINE.

We congratulate Professor Haffkine on the success which has attended his investigation into the plague. We learn that he has not only succeeded in preparing a curative serum on the same lines as that of Yersin, but he has discovered a prophylactic which, if we are to judge from the results obtained in his inoculations in the House of Correction in Bombay, and a report of which we publish in another column, bids fair to rob the plague of its terrors. The success attained by Professor Haffkine in regard to his cholera inoculations encourages us in the hope that the plague vaccine will be equally efficacious. The discoverer of prophylactics against two of the most dreaded of all diseases will take a place amongst the greatest benefactors of mankind.

Medical News.

DR. HAFKINE'S REPORT.

THE following report by Dr. Haffkine, dated the 16th ultimo, was presented to the Bombay

Standing Committee, and it was resolved to forward it to the Corporation:—In view of the urgency of the case, I have the honour to communicate the following information concerning the outbreak of plague in H.M.'s House of Correction, Byculla, where a considerable portion of inmates had volunteered to undergo the prophylactic treatment, and where the first observations on the effect of the treatment have been collected. Between the 23rd and 29th of January last, nine cases of plague have occurred in the jail, of which five proved fatal, the population at the beginning of the outbreak numbering 345 souls. The prophylactic treatment had been applied on the 30th January, 154 inmates, out of a total of 337, volunteering to be inoculated. In the forenoon of the day of inoculation six new patients had been admitted to the hospital suffering from plague: of these three proved fatal. The inoculations were applied in the afternoon. One of the inoculated, Keshow Amar Shanker, prisoner No. 672, had at the time of inoculation a painful gland in the left groin: two others, Abdool Karim, No. 1356, and Govind Pandoo, No. 1222, developed painful glands in the left axilla the same evening. These three cases have also proved fatal. On the first day after inoculation there were among 177 not inoculated prisoners two cases, of which one proved fatal; among 151 inoculated one case rapidly improved and recovered. On the second day after inoculation there was among 172 non-inoculated one case, which proved fatal; among the inoculated—*nil*. On the third day after the inoculation there was among 173 non-inoculated one case, which proved fatal; among 146 inoculated—*nil*. On the fifth day after inoculation there was among 171 non-inoculated one case which proved fatal; among 146 inoculated—*nil*. On the sixth day after inoculation there was among 169 non-inoculated, one case, which proved fatal among the inoculated—*nil*. On the seventh day after inoculation there were among 169 non-inoculated five cases, of which one proved fatal; among 146 inoculated, there was one case, who is alive. Since the 6th instant no more cases have occurred in the jail. The following is a tabulated form of the occurrences: From the 23rd to the 29th January, 1897, there were among the non-inoculated nine cases, of which five proved fatal. The following day, 30th January, was the day of inoculation. In the forenoon and before inoculation, there were six cases among the non-inoculated, of which three proved fatal: in the afternoon and after inoculation there were three cases among the inoculated, which proved fatal. From the 31st January, the first day after inoculation, to the 6th instant, the 7th day after inoculation, there were among the non-inoculated 12 cases, of which six proved fatal, in an average daily strength of 173 non-inoculated; among the inoculated there were two cases, in an average daily strength of

148 inoculated. The experience gained by the observation in this jail tends to show:—(1) That the injection of 3 cen. of the prophylactic seems to be sufficient to effect the desired protection, no repetition of inoculation being necessary to arrest the disease during an existing epidemic. (2) That the prophylactic is powerless to arrest the symptoms of plague already started or which develop in a few hours, but there is the possibility of its influencing the disease in the inoculation period in individuals infected three or four days previously. (3) That the time necessary for the plague prophylactic to produce the protective effect is shorter than in any preventive treatment known, this period being in the anti-cholera inoculation of four days, in vaccination against small-pox of seven days, in the inoculation against anthrax of 12 days, in the inoculation against rabies of 15 days, and in the present treatment, apparently less than one day. (4) The question remains open as to how long will the inoculated persons remain proof against the disease, and, therefore, in order to ensure the probability of a more lasting effect, it is advisable to apply repeated inoculation, with doses higher than the abovementioned. The above conclusions are temporary, and refer only to the teaching of the particular outbreak in question. There remains fully the possibility of the future experience compelling us to modify the above conclusions, though I am unable to abstain from expressing my hope that the general bearing of the results as above detailed, will remain unshaken. The inoculations in the Byculla Jail have been made possible owing to the enlightened efforts of Dr. Murphy, Deputy Health Officer of the Ward; Brigade-Surgeon - Lieutenant - Colonel Waters, Medical Officer in charge of the Jail; Mr. Hall, Superintendent and Dr. King on medical duty in the Jail, and of a number of professors and students of the Grant Medical College, who volunteered to be inoculated in front of the prisoners in order to show them an example.

Adjoined is a summary stating the total number of persons inoculated against the plague between the 10th January and the 16th February, 1897: Hindus—Brahmans 40, other castes 210, total 250; Parsis 222; European Christians 124, Native Christians 28, total 152; Mohamedans 74; Jews 6; grand total 704. Of this number, 66 persons have been inoculated by Dr. Murphy, Deputy Health Officer, and 21 by Surgeon-Major Dimmock, Professor of the Grant Medical College, 170 were inoculated at the Byculla Jail, and 447 at the Petit Laboratory, Jamshedjee Jejeebhoy Hospital.

OFFICIAL PAPERS ON PLAGUE.

No. 322, dated Calcutta, the 5th February 1897.

From—J. P. HEWERT, Esq., C.I.E., Secretary to the Government of India, Home Department.

To—The Secretary to the Government of Bengal, Municipal Department.

IN continuation of my letter No. 46, dated the

Home Department letter No. 46, dated the 19th January 1897, to the address of the Government of Bombay.

Memorandum on the plague by Medical practitioners of Bombay.

Note by the Sanitary Commissioner with the Government of India on the plague in Karachi.

19th January 1897, I am directed to forward, for the information of the Government of Bengal, a copy of the papers noted in the margin, connected with Surgeon-Major-General Cleghorn's visits of Medical Inspection to Bombay and Karachi, and the remedial measures that have been adopted in those cities.

2. It will be observed that the view of Dr. Cleghorn, and of other qualified Medical gentlemen who have studied the subject, is that the incidence of the disease is to a large extent due to local causes, and that it is at present only slightly epidemic or contagious in the ordinarily accepted sense of these words. They are also of opinion that the best practical means of checking the increase of the plague has been found to be the abandonment and thorough disinfection of infected houses and localities, and the removal of the inhabitants to camps constructed in the open. The authorities at Karachi have been particularly successful in the construction of these camps, and in securing the removal of the inhabitants of the infected quarters to them.

3. Should the means adopted to prevent the spread of the disease to Calcutta unfortunately prove ineffectual, it will be necessary to take measures similar to those described by Dr. Cleghorn, in order to minimise the evil as far as possible, and, in the opinion of the Governor-General in Council, it is desirable that the local authorities should make their preparations now, so that there may be no difficulty in taking vigorous action to suppress the disease should it break out. I am, therefore, to suggest that, with the permission of His Honour the Lieutenant-Governor, arrangements may be made for the construction of camps of refuge in suitable places, in the event of their being ultimately required. The Government of India will be glad to be informed, in due course, of the arrangements made.

No. 45, dated Calcutta, the 19th January 1897.

From—J. P. HEWERT, Esq., C.I.E., Secretary to the Government of India, Home Department,

To—The Secretary to the Government of Bombay, General Department.

I AM directed to forward, for the information of His Excellency the Governor in Council, a copy of a Memorandum signed by some of the principal European and Native Medical Practitioners of the City of Bombay and Members of the Special Research Committee, regarding the bubonic plague in that city and measures for arresting its progress. This Memorandum has

been presented to the Government of India by Surgeon Major-General Cleghorn, Sanitary Commissioner with the Govern-

Home Department telegram No. 1, dated 2nd January 1897.

Bombay Government telegram, dated 4th January 1897.

ment of India, on return from his visit to Bombay, which formed the subject of the telegraphic correspondence with the Government of Bombay cited in the margin. Dr.

Cleghorn shares in full the views recorded in the Memorandum.

2. His Excellency in Council will observe that the view is expressed that the bubonic plague now prevailing in the city of Bombay is, under certain conditions, only slightly contagious or infectious; that its incidence is largely due to local causes, and that the only effective way of dealing with the outbreak and of arresting progress of the disease, is to insist on the evacuation of houses in which cases of plague have occurred. The gentlemen who have signed the Memorandum consider that there will be no difficulty in providing sufficient and suitable accommodation for people removed from infected houses, and that it only requires the concurrence and sympathy of the leaders of the different sections of the community to render the plan proposed by them a success.

3. The Government of India regard this influential medical opinion, that the plague is not at present either general epidemic or contagious, as of very great importance. The history of previous outbreaks of the disease shows, however, that it has a strong tendency to epidemicity. There has already been very grave loss of life in the population of the city, and the consequences to the trade of Bombay, already very serious, promise to be disastrous, unless the plague can be speedily reduced. Should it assume a more severe epidemic form, the whole of India may be affected. The Government of India are therefore of opinion that there should be no hesitation in taking the strongest measures to prevent its spreading, even though they may be once distasteful to the people affected. The particular measures advocated in the Memorandum, namely, the removal of all persons from infected houses and the thorough disinfection of those houses, appear to the Government of India to be well calculated to check the progress of the disease, and the vigorous action that has been taken to cleanse and disinfect the infected parts of the city, having failed to arrest its progress, it appears to the Government of India to be necessary that they should be adopted. Dr. Cleghorn has also reported to the Government of India that the nature of the buildings, in which a large proportion of the inhabitants of Bombay dwell, make it specially important to remove all persons from infected houses, and to allow the officers of the Health Department to thoroughly

cleanse and disinfect such houses. He points out that in the large and ill-lighted and ill-ventilated houses or chawls, occupied by so many as 500 to 1,000 individuals, means of disinfection and cleansing can only be effectually carried out by the complete evacuation of the tenement in which a case of plague has occurred.

4. I am to say that the Governor-General in Council commends the suggestions contained in the Memorandum to the earnest attention of the Government of Bombay, and trusts that the Governor in Council may find it possible to act upon them. Should the Government of Bombay concur in thinking that the removal of all persons from infected houses is the best practical method for checking the progress of the plague, the Governor-General in Council will be glad to learn, in due course, the measures which are adopted to bring the plan into general effect.

It will no doubt commend itself to the Government of Bombay that convenient temporary accommodation, suitable to the families to be removed, should be got ready, before measures for evacuation are taken. It seems to the Government of India desirable that, unless the Governor in Council sees objection to this course, the Memorandum should be made public. The Government of India would be also glad to know whether the Government of Bombay consider it necessary to strengthen the building regulations of the city, and to take increased power to prevent over-crowding in the chawls.

5. Dr. Cleghorn has suggested that two of the Deputy Sanitary Commissioners, serving under the Government of Bombay, should be placed at the disposal of the Health Officer, free of cost to the Corporation. I am to request that this suggestion may receive the consideration of His Excellency in Council.

6. In conclusion, I am to say that the Governor-General in Council has learnt with the greatest satisfaction of the untiring energy which has been displayed by the local authorities in the thorough and systematic cleansing and disinfection of the infected parts of the city. The liberal measures sanctioned by the Corporation towards these ends, and the energy displayed by the Executive Officer of the Corporation, viz., Mr. Snow, Municipal Commissioner, Brigade-Surgeon-Lieutenant-Colonel Weir, Executive Health Officer, and Mr. James, Executive Engineer, and their subordinates, are appreciated by the Governor-General in Council, as they are no doubt also by the Government of Bombay. It is, in the opinion of the Government of India, only by continuing and extending these efforts unremittingly, and by supplementing them by even stronger measures, such as that which is suggested in this letter, that the spread of the disease can be successfully and effectively arrested.

Memorandum on the Plague by Medical Practitioners of Bombay.

WE, the undersigned Medical Officers and Members of the Special Research Committee, are of opinion that the bubonic plague, now prevailing in the city is, under certain conditions, only slightly contagious or infectious, and the facts observed in connection with individual cases and those associated with the general progress of the disease, warrant us in concluding that its incidence is greatly due to local conditions.

We are emphatically of opinion that the only practical method of dealing with the outbreak, and of arresting the progress of the disease, is by the removal of the inmates from those houses in which a case of the disease occurs.

We quite appreciate the practical difficulties attending the adoption of this proposal, but in such an emergency as the present, these difficulties can and must be overcome. The Municipal Corporation will, no doubt, provide suitable huts, free of rent, for the accommodation of the different classes, and we understand that Mill Companies, and other employers of labour, are prepared to erect huts for their different employes. The experience gained in the melas at Allahabad and Hurdwar will be available, as to the construction and arrangements of the huts.

There will be no difficulty experienced in providing sufficient and suitable accommodation for the evicted, and it requires only the concurrence and sympathy of the leaders of the different sections of the native community to render the scheme a success. If houses in healthy localities are available for occupation, there is no reason why they should not be utilized.

The steps leading up to removal would be the report to the Health Officer of a case by a duly qualified Medical Officer. The Health Officer would then notify the occurrence to the Municipal authorities, and would at the same time submit his recommendations for the removal of the inmates in the particular home, and if he considered it necessary, of those also in the immediate neighbourhood. The Municipal authorities would then take the necessary action, and indicate the huts available. Carts, if necessary, should be provided free of cost, for the removal of the goods and chattels of the inmates.

The person attacked would either be removed to hospital or remain in the house with his or her relatives, until recovery or death took place. The house would then be completely vacated and taken possession of by the Health Officer for purposes of cleaning and disinfection, and he should be invested with full powers, in consultation with the Executive Engineer, for removing all partitions, erections or portions of house walls which impede or obstruct ventilation. After an interval, to be determined by the Health Officer, the house would be reoccupied.

There can be no question as to the necessity for the adoption of the measure we now advocate, and we trust that, in the interests not only of Bombay, but also in those of the whole of India, it will be at once accepted and acted upon, more especially as the untiring energy displayed in the thorough and systematic cleaning and disinfection of the affected parts of the city has as yet failed to arrest the progress of the disease.

K. N. BAHADURJI.

JAMES ARNOTT.

TEMULJI BHICAJI NARI-

MAN.

ISMAIL JAN MAHOMED.

BHALCHANDRA KRISHNA.

E. H. HANKIN.

L. F. CHILDE.

ACOACIO G. VIEGAS.

N. F. SURVEYOR.

THOMAS BLANEY.

HENRY COOK, M.D., *Surgn.-*

Maj.-Genl.

JAMES CLEGHORN.

Director-General,

Indian Medical Service.

T. S. WEIR.

SYDNEY SMITH.

I am of the opinion that, as there are facts showing that the plague is spread by people coming from infected localities, the measures compelling the inhabitants to leave those localities ought to be accompanied by others calculated to control their further movements.—W. M. HAPKINE.

Note by Surgeon-Major-General J. Cleghorn, Director General, Indian Medical Service, dated 16th January.

I beg to submit copy of a Note signed by those Medical practitioners of Bombay who have had the greatest opportunities of becoming practically acquainted with the present outbreak of bubonic fever, and along with it, to prevent any future misrepresentation, a Memorandum of the remarks I made to those gentlemen, before I submitted the Note for their approval and signature.

The proposal now submitted is quite a practicable one, more especially if the leaders of the different communities would interest themselves in the matter, and explain to those communities the necessity for the adoption of the recommendations. It is feared that if compulsory evacuation of infected houses is carried out, more especially in the case of Muhammadans, that there will be an outbreak; this is the prevailing feeling among the natives, and it was suggested to me that if His Excellency the Governor could admit several of the chief Moollahs to a private interview, the matter could be easily arranged.

The Corporation have practically conferred full powers on Mr. Snow, the Municipal Commissioner; and his Exeentives, represented by Dr. Weir, Head of the Health Department, and by Mr. James the Executive Engineer, have carried out their different duties vigorously and systematically, and at the same time have exhibited great tact in doing so.

The feeling of the native population has been decidedly against the sanitary measures enforced until a short time ago, when it has veered round, and the people are now willing to allow that benefit has resulted from those measures.

It would greatly strengthen the hands of the Health Department if His Excellency the Viceroy stated that he was pleased with the measures taken by the Corporation, and especially thanked Mr. Snow, Brigade-Surgeon-Lieutenant-Colonel Weir and Mr. James for the exertions they have hitherto made. The whole city is now under the inspection of the Health Department. All latrines, drains and gullies are being flushed; houses as far as possible, are being cleaned, disinfected and whitewashed, and in those parts of the city not drained, surface drains of excellent construction are being made in connection with the house-pipes. The continuance and extension of this work should be insisted upon as being of the greatest importance, and it should be clearly understood that there is no salvation outside the adoption of sanitary measures. The efforts of the Health Department are to a certain extent frustrated by the difficulty they find in cleansing and disinfecting inhabited houses, as this can only be effectually carried out in the case of rooms in which cases of plague have occurred, or in those which have been vacated by the tenants. The proposal now submitted of evacuating all houses in which a case of the disease has appeared, will enable the Health Department to apply its measures to the house as a whole. The importance of this will be understood from a description of the houses. The chawls or tenements may run up to seven stories, and the unit of construction is a long corridor with rooms opening on either side. In the corridor, either at one end or in the centre, is situated a water-tap with bathing platform, and alongside it a latrine with two or three seats. The whole tenement is built up of a congeries of these corridors and rooms, and contains from 500 to 1,000 individuals. The only space between each tenement is a gully sufficiently wide to admit a sweeper. In most of the corridors and rooms, either from the absence of openings or from the obstruction of the existing ones, there is absolutely no light admitted, and consequently no ventilation. The Health Officer informed me that he estimated that 70 per cent. of the population live in such houses. The corridors, before being taken in hand by the Health Department, were the repositories of filth of all kinds, and it is surprising that the mortality under such conditions has been so small. It shows, I think, that the disease, in the common acceptation of the terms, is only slightly contagious or infectious, and that its incidence is chiefly due to local conditions.

The importance of removal from the infected locality thus becomes apparent. Dr. Weir, the Health Officer, is now gradually trying to vacate infected houses, and if generally carried out, he will require more assistance than at present. Under any circumstances, I do not consider that he has a sufficient number of

officers for the supervision of operations, and I would recommend that the Government of Bombay should place at his disposal, free of cost to the Corporation, two of the Deputy Sanitary Commissioners serving under the Government of Bombay.

At the same time it should be suggested that the Sanitary Commissioner and one Deputy Sanitary Commissioner should proceed to Karachi and take over the arrangements connected with that city. The Health Officer is a native, and is, I am afraid, wanting in the necessary force of character and initiative.

The Government of Bombay should, I think, legislate in the direction of conferring powers on the Municipal Committee to regulate the building and construction of houses, and to place a limit on the number of people inhabiting each room and house. Many of the former are now simply unfit for human habitation, and the sanitary arrangements connected with them are of the most crude and primitive description."

LONDON LETTER.

THE excessive and increasing prevalence of venereal diseases in the European Army located in India is exciting much attention at the present time. It is recognised that not only are these diseases a serious cause of disablement and inefficiency in the army, but that they are also a veritable and grave cause of degradation of the constitution and health of a substantial and growing proportion of the civil population of Great Britain. The policy of ignoring prostitution and its effects and taking no thought or action to prevent this class of preventable maladies is becoming discredited, and the Press, medical and lay, is beginning to clamour for prompt and effective repressive measures. A very strong and cogent article has been extensively and approvingly quoted from the *Allahabad Pioneer* in which the necessity of interference is clearly proved. It is whispered that this view has been pressed on the Government from exalted quarters, and a strong committee, under Lord Onslow, is at present engaged in taking evidence on the subject and paving the way, it is noted, for resolute action. Suppressing prostitution by ignoring it is a vain and foolish expectation, contradicted by all history and now signally disproved by this large and disastrous experiment by which so many lives have been blighted, and the constitutions of so many innocent persons ruined. These maladies no doubt arise from abuse of a natural function, but this fact does not act as a deterrent against vice nor as a means of controlling those instincts and impulses which next to the love of life are undoubtedly the strongest animal motives. If what may be conceded to be the natural punish-

ment of abuse and vice fails to deter; the main, if not the sole, argument in support of the *laissez faire* policy falls to the ground. On the contrary, even from the purely moral point of view, the opposite policy of recognising and regulating has been proved by experience to have a more deterrent, suppressing and rescuing influence than the others. That most dangerous species of prostitution, the clandestine, is minimised, and many women thus prevented from entering on a career of open dissipation and debauchery, and means are placed at the disposal of the benevolent of bringing salutary influences to bear on those who have entered on a life of vice and of persuading and assisting them to abandon a loathsome and irksome servitude to passion and turn to quiet and useful modes of earning a livelihood. The moral argument when extended is entirely in favour of preventive and repressive measures. Venereal disease is not the only physical consequence of moral ill-doing. Physical evil is largely, if not mainly, the outcome of sin of some sort, yet it has not, on that account, been considered sinful to take thought and effort to prevent and control. No doubt the real remedy consists in going to the fountain head and cleansing the spring; but this cannot be accomplished by folding the hands, standing aloof, and simply watching the operation of cause and effect. Efforts to avert physical evil necessarily imply restriction as regards the causes, and in this particular case, the deprivation, of liberty to infect and the restoration to health both include actual suspension, if not abolition, of vice in its most reckless and abominable forms. The principle of prevention is the same as in the case of any other disorder communicable from one human being to another, namely, segregation, as long as infectiveness continues. For the purpose of segregation, notification or detection is necessary. These principles should theoretically apply equally to men and women who become contaminated and dangerous. They are more easily applied to women who make prostitution a profession; but there ought to be no difficulty in the army in dealing with diseased men for the purpose of rendering the spread of disease less easy than it is. That something must be done to prevent the British Army from continuing to be a foreign bed of nasty complaints seems quite certain, and the sooner the better.

The examinations for the Army Medical Staff and Indian Medical Service are in progress. Forty-one candidates have come forward to compete for thirty-five vacancies in the former, and twenty-four for seven vacancies in the latter. It is satisfactory to find that the boycotting of the Army Medical Department seems to be at an end. Some concessions as regards leave and pay have been made, and others will probably follow in time. Surgeon-Major-General Jameson in his address at Netley at the close

of the last session made some very sensible remarks on agitation for the redress of service grievances. He especially condemned anonymous attacks on the authorities in medical and service journals by medical officers on the active and retired list. Grievances exist in every service, civil and military, and open and constitutional methods exist of representing them. The worst method of attempting to procure relief is setting the backs of the authorities up by intemperate and violent anonymous writings. Concessions forced by such means, if indeed they ever are so obtained, are apt to be meagre, grudgingly given, and easily revoked, while a sore, unpleasant and hostile feeling towards those who descend to the use of masked attack remains. It seems better to give the Government credit for a desire to exercise justice and generosity than the reverse. So far as I can learn, the present Secretary of State for War is fully impressed with the value and importance of the medical services of the army, both in peace and war, and most anxious to do all in his power to promote contentment and efficiency—conditions which are very intimately related.

The Bombay plague is being keenly watched in Europe, and a sort of panic has arisen among the nations for fear of an extension westward. An important conference is to assemble at Venice on the 16th of this month for the purpose of discussing defensive measures. Meantime resort is being made at many ports to quarantine and prevention of unloading Indian goods. I see that an authoritative declaration has been made in India that plague is not contagious. No doubt this is quite true in the restricted meaning of the word; but that the disease is communicable from man to man and community to community and portable by human agency cannot be denied; no good can come of absolute denial such as I have referred to, nor can resort to precautionary methods of averting the spread of plague be condemned. The only question really is, what methods are best. The choice lies between the discredited and antiquated system of quarantine which is favoured by European powers, and the English system of early and exact information, thorough inspection, isolation of the infected and subsequent watching of the rest—as was recently so successfully put in practice in the case of the Nubia.

12th February 18 7.

Current Medical Literature.

MEDICINE.

EXAMINATION OF EYES IN THE PUBLIC SCHOOLS OF BALTIMORE. By H. HARLAN, M.D., AND H. WOODS, M.D. (*The Journal of the American Medical Association*).—The eyesight of school children needs far more care and attention than is usually accorded to it. Owing to the ignor-

ance or neglect of parents and guardians many a child suffers grievously from headaches, has the eyesight seriously damaged, or is set down as lazy or stupid, simply owing to the vision not being tested and defects not being corrected.

The city of Baltimore has set a good example in this matter,—thanks to the public-spirited action of its physicians, who have devoted much of their time and energies gratuitously to improving the vision of the rising generation of their fellow-citizens.

A medical committee was formed; teachers were instructed how to test the eyesight of children, and to record the result every year; notices were sent to the parents of children with defective vision, advising examination by an oculist at a public hospital or privately. "The eyes of 53,333 pupils were tested. Of these a little over 43% were found to have 20-20 vision in each eye, and 39% additional as good as 20-30 in the better eye. Fifteen per cent. came between 20-30 and 20-200, and 303, or 0.56% had less than 20-200 in the better eye. The lowest percentage (35%) of normal eyes was found in the first or lowest grade, and the highest (56%) in the eighth or highest grade." x x x Much good has been done, both in arousing general public interest in the question and in the direct benefit many children have received. Much greater good may be expected to accrue in the future."

SUBCONJUNCTIVAL INJECTIONS IN THE TREATMENT OF CERTAIN DISEASES OF THE EYE. By W. H. WILDER, M.D. (*Medicine*).—Prof. Reymond, of Turin, introduced this method, which consists in injecting 2 or 3 minims of a 1 in a 1,000 solution of corrosive sublimate or of cyanide of mercury beneath the conjunctiva. To reduce the pain a 4% solution of cocaine is first used; but the pain and inflammation are often severe in spite of this.

This procedure has been used and recommended by Abadie, Deutschmann, Darier, &c., in the treatment of wounds of the eyeball, infectious ulcer of the cornea—with or without hypopyon, iritis of all kinds, iridocyclitis, iridochoroiditis, hyalitis, retinitis, neuritis, optic nerve atrophy, sympathetic ophthalmia, and the choroidal changes associated with myopia.

Dr. Wilder has tried this method extensively during the last three years, and has found it a valuable aid in affections of the iris and choroid. He considers this form of treatment "a powerful adjunct to the old and tried methods in some diseases of the eye. It seems to be most efficacious in diseases of the iris and choroid of all varieties, especially where adhesions do not yield to atropine and antiphlogistic measures. In violently acute cases it seems contra-indicated until there has been some abatement of the inflammation. This is the opinion of those who have used it most extensively, according to Dr. Bernstein. It is not supposed that this means

is to be employed to the exclusion of other well known valuable remedies, and in a case of iritis we would not omit the atropine, hot compresses, leeches, constitutional treatment, &c., that experience has shown are invaluable."

THE MEDICO-LEGAL ASPECT OF EYE AND EAR CASES. By J. W. PARK, M.D. (*The Journal of the American Medical Association*).—In this paper Dr. Park impresses on the general practitioner, or the family physician, the necessity of making careful and early examinations of the eyes and ears in patients who have met with railway or other accidents. He inculcates the advisability of recording the results of such examinations, because large sums of money, as "damages," may be at stake at a later date when it might be difficult to prove or disprove any causal connexion between the *then* morbid condition and the previous accident. His views are thus summarized:—

"In all accidental injuries, operative cases as well as in general diseases of the eye and ear, make a thorough examination of the parts involved. Keep a record describing in detail all the parts injured, and your opinion as to any previous pathologic conditions that are present now and may have existed prior to the present injuries sustained, and the relation they bear to each other as regards the impairment of vision or hearing for the present or future."

TREATMENT OF OPTIC NERVE ATROPHY BY MERCURIAL INUNCTIONS IN CONJUNCTION WITH THE HOT BATHS OF THE HOT SPRINGS OF ARKANSAS. By O. J. SHORT, M.D. (*The Journal of the American Medical Association*).—Dr. Short gives details of five cases, out of forty-one, which he has treated in this manner. His conclusions are:—

1. "That in those cases having only light perception, treatment is of no avail; but where there is any vision left, that the progress can be checked, and if the vision has not gone below 20-200, unless from traumatic origin, we may expect benefit.

2. That the mercurial inunctions in conjunction with the hot baths are always beneficial.

3. That unless the origin is from specific, blood or mineral poisons the use of potassium iodide is more harmful than beneficial.

4. That strychnia, as a rule, is good only in cases of spinal origin."

BLENNOSTASINE. By W. F. CHAPPELL, M.D. (*The New York Medical Journal*).—The name is derived from the drying, or blennostatic property of the drug, which is a derivative of one of the cinchona-bark alkaloids. It has a marked vaso-constrictor action on the respiratory tract, and is useful in hay fever, coryza, influenza, rhinitis, bronchorrhea, &c. It may be given in capsules, or in one-grain gelatin-coated pills. The dose ranges from one to four grains every hour.

A PHYSICAL SIGN OF THE RHEUMATIC DIATHESIS. By W. F. LITCHFIELD, M.B. (*The Australasian Medical Gazette*).—Dr. Litchfield has noticed that subjects of rheumatism are endowed with an ample supply of firm subcutaneous fat, which he considers pathognomonic. His line of argument is:—(1) In rheumatic people, and in babies or young children, the subcutaneous fat is firm and tense. (2) Both children and rheumatic patients are subject to anæmia. (3) An excess of uric acid in the blood is associated with anæmia or chlorosis. (4) In rheumatism and acute rheumatism there is an excess of uric acid. (5) Children are very subject to rheumatism. From these data he deduces the annexed table:—

Rheumatics have		{ Excess of Uric Acid circulating in their blood. }		Are Anæmic, have		{ Tense subcutaneous tissues. }	
Chlorotics	"	"	"	"	"	"	"
Babies	"	"	"	"	"	"	"

The writer's process of reasoning seems rather loose and disconnected. However, his contribution is only "a preliminary note," which he may amplify in a future article. In persons of a rheumatic diathesis, i.e., predisposed to acute rheumatism, he has observed "the baby condition of skin and subcutaneous tissue obtains more or less. In them, speaking from such cases as I have observed, the padding of fat that exists normally on the extensor surfaces becomes tenser, and the flexor surfaces become padded with a tense subcutaneous tissue. The face has a characteristic, smooth appearance, and folds take the place of creases and wrinkles. For the estimation of this sign of the rheumatic diathesis I would recommend the examination of the front of the arm and the face. If in an adult the skin cannot be freely pinched up over the biceps, and if the face has the characters described above, I am prepared to say that such a person has a strong rheumatic tendency."

TREATMENT OF SCIATICA BY MASSAGE. By GUSTAF NORSTROM, M.D. (*The New York Medical Journal*).—Dr. Norström draws attention to myositis as a concomitant of sciatica of rheumatic origin. The glutæus medius, especially at its upper attachment, is the favourite seat of the myositis. The peroneal muscles are sometimes affected in the calf, particularly towards their lower insertion. This, he considers, accounts for the pain frequently experienced near the outer malleolus. He believes massotherapies to be the best treatment for sciatica, beginning with a prolonged *effleurage* before the patient can bear more powerful and deeper massage.

CORSICAN FEVER. By W. W. SKINNER, M.D. (*The New York Medical Journal*).—From the writer's description Corsican fever bears a strong resemblance to the malarial fevers prevalent in India, both as regards etiology, symptoms, and treatment.

Visitors are specially susceptible, and suffer most from the middle of May to the time of the autumn rains, which usually occur in October. The safest time to visit the island is between the months of November and April. The time of sunset and the hour immediately following is an unsafe one in which to be out of doors to those unaccustomed to the climate.

A SIMPLE METHOD FOR THE DETECTION OF LEAD IN ORGANIC FLUIDS. By J. H. ABRAM, M.D. (*The Lancet*).—Some cases of lead poisoning are obscure in their inception, owing to the symptoms being variable and insidiously developed. It is therefore important to have a simple and accurate test for lead in the urine. Such a test has been discovered by Dr. Abram.

A strip of pure magnesium is placed in the fluid to be examined. Ammonium oxalate in the proportion of about 1 gramme to 150 cc. is added. If lead is present it is deposited on the magnesium. A deposit is seen within half an hour, but we have usually left it for 24 hours. The slip is then washed with distilled water and dried. Confirmatory tests: (1) Warm the slip with a crystal of iodine—yellow iodide proves lead, cadmium may be ignored; (2) dissolve deposit in nitric acid and apply usual tests. The magnesium can be used again after careful washing with acid and distilled water. The surface of the magnesium must be bright—free from oxide—when used. The delicacy of the method has been tested with aqueous solutions containing known quantities of lead, also with normal urine to which known quantities of lead have been added. In all cases a control experiment was performed to ensure the freedom of the materials from lead. Without going into details I may say that we have been able to detect lead when present in the proportion of 1 part in 50000, whether in simple aqueous solution or in urine."

D. M. MOIR, M.A., M.B.

OBSTETRICS AND GYNÆCOLOGY.

THE TREATMENT OF ECLAMPSIA. (From the International Gynæcological Congress in Geneva).—*Charles*: Eclampsia is the result of different causes and accordingly more or less dangerous. Usually the result of poisoning of the blood by an accumulation of waste products normally removed by the liver and kidneys; rarely of reflex nature. Intoxication of renal origin is most common and generally accompanied by albuminuria and oedema of various parts of the body. Albuminuria, however, is not the cause of eclampsia, but only a disease symptom originating from the like cause. The author's statistics show 1 case of eclampsia in 151 confinements with a maternal mortality of 24.42 per cent. while the infantile death-rate is 41.83 per cent. The disease is most frequent in primipare, but the death-rate is higher in the latter. *Charpentier*;

The urine of every pregnant woman must be examined with great care at frequent intervals; when the presence of albumin in the urine shows that the woman is threatened with eclampsia, danger can be avoided by a strict milk diet. At the beginning of eclampsia venesection is indicated in women of robust constitution and with a cyanotic countenance; 300 to 500 grammes of blood should be abstracted. Afterwards chloral is administered. Eclamptic attacks are combated by chloroform inhalation, while diuresis is favoured through subcutaneous infusions of physiological saline solution. Whenever possible the natural termination of labour is advised, and use of instruments is cautioned against. If, in spite of pains, delivery does not progress, version or forceps is indicated in the living child, otherwise craniotomy. The soft parts must be dilated or easily dilatable before instrumental delivery should be attempted. The induction of premature labor is reserved for exceptional cases. Cæsarean section and *accouchement force* are only permissible as *dernier ressorts* in desperate cases. *Veit*: Many cases will recover under any treatment. The proof that a forcible delivery in deep narcosis gives the best prognosis has as yet not been substantiated. The results obtained from the systematic administration of large doses of morphine have not been equalled by other methods. The favourable reports of success from venesection are not sufficient in number to permit the passing of final judgment. A rational therapy of eclampsia is not possible until the etiology is absolutely clear. Hastening of labour by rupturing the membranes, delivery after completion of dilatation, administration of large doses of morphine to diminish the frequency of attacks, no nourishment *per os* and the production of diuresis through external means is to-day the best and safest method of treatment. In exceptional cases more grave operations may be permissible. *Byers*: Elimination of toxins is hastened by an administration of hot baths and packs cathartics and diaphoretics. If eclampsia occurs before the onset of labour, the latter should not be artificially stimulated. In intra-partum eclampsia the administration of chloroform and rapid termination of labour are advised. Rest, milk diet, laxatives and hot baths are the best prophylactic therapy. *Turnier*: Milk diet is the best prophylactic. Since 1892 he has treated cases of eclampsia with chloroform, chloral, venesection and milk; the latter administered, if necessary, with the stomach tube. The mortality at his clinic has sunk to 9 per cent. and there has so far (September 1896) not been a single death in 1896. *Lindfors* demonstrated specimens showing a dissemination of liver cells in the blood of eclamptic women. He drew particular attention to the fact that the emptying of the uterus is not always followed by a cessation of the eclamptic seizures. *Pancord* advises milk

diet as the best known prophylactic. *Queirel* observed during the years 1890-96 in 1,200 labour cases 27 case of eclampsia; not one case originated in the hospital. He ascribes the absence of eclampsia among the hospital cases to the rigid milk diet enforced in every case of albuminuria. *Morisani* draws attention to the cessation of albuminuria and eclamptic seizures after the death of the foetus. There must therefore be a certain connection between foetus and eclampsia. In the treatment of eclampsia the following rules are laid down. Medical treatment only during the 4th and 5th months of pregnancy. In the beginning of labour, after sufficient dilatation, immediate delivery is indicated. If the os is rigid and contracted, artificial dilatation preferably with the finger. *Dührssen's* method of deep incisions is not favoured; instead of these he advises in desperate cases Cæsarean section. *Pasquali* agrees with *Morisani*, and *Fochier* believes that the cause of eclampsia is the resorption of digestive products by the stomach, he therefore recommends washing of the stomach and the instillation of milk and chloral.

SECONDARY ABDOMINAL PREGNANCY, GOING TO FULL TERM AND FOLLOWING TRAUMATIC RUPTURE OF THE UTERUS IN THE FOURTH MONTH OF GESTATION; LAPAROTOMY THREE WEEKS AFTER THE DEATH OF THE FŒTUS; RECOVERY. (*American Journal of Obstetrics*.) This case is probably unique in medical literature. A woman, *et* 42, was admitted to Leopold's clinic on 19-12-91 with the diagnosis of abdominal gestation. She married in 1873 and had given birth to eleven children. Eight confinements normal; in the last three placenta adherent, requiring manual removal and followed by fever and tedious recovery. She ceased menstruating in 1887, but yet conceived four years later. In the spring of 1891 she observed that her abdomen grew larger; life was felt in the beginning of August, the foetal movements being painful from the outset. About this time she fell down a flight of stairs, landing heavily on her buttocks, and back, this was followed by neither bleeding nor inflammatory symptoms, but the foetal movements were accompanied by such intense pain that she had to remain in bed. Three weeks before admission to Leopold's clinic foetal life and the pains ceased; instead of them appeared chilly sensations, headache and general discomfort. A discharge of blood or decidua was never observed. A physical examination made on admission showed a pendulous belly hanging over the symphysis, in which region a head could be felt; the latter appeared to be directly underneath the abdominal walls, the sutures and fontanelles being plainly distinguishable. The breech and small parts were felt on the left side, while opposite an elastic mass reaching up to the umbilicus could be made out. The left fornix vaginae was occupied by a small moveable body apparently belonging to the foetus. The history

and physical examination resulted in the diagnosis of abdominal pregnancy of a fully developed foetus dead about three weeks.

December 21st laparotomy was performed. The abdomen was occupied by a sac having their transparent walls containing a foetus. After rupturing the sac, and ligating the cord a dead foetus was extracted. Following up the cord to reach the placenta, it was found to lead into the uterus through a small slit in its posterior wall. To leave the placenta in the uterus and remove it per vaginam was decided dangerous, and the uterus was therefore extirpated. Treatment of stump extra-peritoneal. The woman made a good recovery. Inspection of the extirpated uterus showed a rent in its posterior wall about 2 centimetres long and partially closed; from this the umbilical cord emerged. The opened uterine cavity was filled by a placenta succenturiata showing recent hæmorrhages underneath and into its substance. Its cavity was lined with foetal membranes except at the point of exit of the cord.

Leopold concludes that the ovum developed primarily intra-uterine. In the fourth month of gestation the woman sustained a traumatic rupture of the uterus, the sharp point of the promontory lacerating its posterior wall. The foetus escaped into the abdominal cavity without, however, rupturing the membranes. It continued to grow in its new quarters while the placenta remained in the uterus. The absence of bleeding and inflammatory symptoms is explained by a gradual escape of the foetus from the uterus, its surrounding membranes acting as a tampon, while the placenta remaining *in situ* prevented sudden uterine contractions. At the end of gestation the uterus made ineffectual efforts to empty itself; this is seen by the partial detachment of the placenta and the extravasation of blood underneath its walls and into its substance.

KEDARNATH DAS, M.D.

Vital Statistics & Sanitation.

RESOLUTION OF GOVERNMENT, N.-W. P. AND OUDH. "BUBONIC PLAGUE."

OBSERVATIONS.—The adoption of measures to prevent the introduction into these Provinces of the bubonic plague now prevalent in Bombay has occupied the attention of this Government. Hitherto the measures adopted have consisted in the appointment of subordinate medical officers to the principal railway stations on the frontier and at railway junctions to observe the condition of passengers arriving from Bombay, and in the independent action by District Officers in keeping under observation persons known to have returned to their homes in these Provinces from the Bombay Presidency. The observation, however, at railway stations cannot lead to the detection of cases in which the prominent symptoms of plague are not apparent, much less to the detection of cases in which the disease is in the state of incubation and has not disclosed itself; and the independent action of District Officers needs to be extended and regulated.

2. It appears that there is considerable intercourse between certain districts of these Provinces and Bombay. For instance, many weavers are known to have sought employment in the Bombay direction. With the large exodus taking place from Bombay at present, there is reason to believe that these and other persons are returning to their homes in these Provinces: a system of general observation is therefore necessary, and towns and vil-

lages the inhabitants of which are known to be directly connected with Bombay require above all to be carefully watched. It has become a matter of urgent necessity to establish a system of ascertaining the health of these immigrants and of immigrants who have already returned to their homes from Bombay, and of taking all sanitary precautions to prevent the spread of the disease should it break out—precautions which recent legislation has placed it in the power of the Government to adopt.

3. *Rural villages.*—The agency at the disposal of the Government in the interior of a district for ascertaining the required information is at present four-fold. First, there is the Police. Second, the Revenue staff [patwari, kanungo, etc.]. Third, the officers at present engaged in Famine Relief in certain districts. Fourth, the Hospital Assistants at the Branch Dispensaries. Each organization must now be turned to the best account for the object above stated: and detailed rules defining clearly the duties of each class of officer, issued by the Government under Act No. III of 1897, are appended to this Resolution [Annexure A, Part I].

4. In every district lists will be made out of villages known to be directly connected, by trade relations or otherwise, with those parts of India in which bubonic plague is prevalent. To such villages the rules relating to the reporting of deaths when cholera is epidemic will be applied, that is to say, daily reports will be required. At the same time, a register will be prepared in each police station, from reports furnished by village policemen, of all persons who have returned from any part of the Bombay Presidency since the beginning of January, or who may return in future so long as these regulations are in force. On receiving information of the death of any person whose name is recorded on the register or who resided in any village from which daily reports are submitted, or on finding that an unusually large number of deaths are returned from any village in his circle, the officer in charge of the police station will inquire into the symptoms which are alleged to have preceded death. If there is reason to believe that these answer the description of the symptoms of bubonic plague given in the instructions issued for his guidance, the officer in charge of the police station will go to the village concerned, and pending the arrival of a superior officer will, in a case of ascertained plague, take certain precautionary measures with a view to the prevention of the spread of the disease in the village. The Tahsildars, who will also receive information through the patwaris, will supervise the action taken by the police, and give such assistance as may be required by the circumstances of the case.

5. From the inquiries made in Karachi and Calcutta it appears that the best practical means of checking the increase of the plague has been found to be the abandonment and thorough disinfection of infected houses and localities, and the removal of the inhabitants to camps constructed in the open, and the Lieutenant-Governor and Chief Commissioner wishes this principle to be kept prominently in view. It will be the duty of the district authorities to take steps to secure the temporary abandonment of infected houses, and if such a course be necessary, of infected villages or portions of villages. The inhabitants should camp in the open or under trees at a suitable distance from the infected spot, and will not be allowed to return until the place has been thoroughly ventilated, disinfected, and pronounced fit for occupation by the Medical Officer.

6. *Municipalities and small towns.*—The rules applying to villages will be applied, *mutatis mutandis*, to municipalities, cantonments and towns administered under Act XX of 1856. Here also the chief remedy to be adopted is temporary evacuation of infected houses or mahallas, and the occupation of temporary settlements well beyond the limits of the town, until return is permitted. The Lieutenant-Governor and Chief Commissioner desires to impress upon Municipal Boards the urgent necessity of scrutinizing the death returns, of checking, so far as possible, the recorded causes of death, and of supervising most carefully the sanitary arrangements, a duty which has already been urged upon them in G. O. No. ²⁵²⁶ ~~2525~~ ²⁵²⁶ ~~2525~~ B, dated 16th October 1896. It is especially

necessary that the latrine arrangements of all private masonry houses in towns should be at once examined, and put in a thoroughly satisfactory condition. For the Benares Municipality an Assistant Surgeon has already been appointed as Special Health Officer, and similar appointments will be made in the large towns of Agra, Allahabad, Cawnpore, Fyzabad, Lucknow and Meerut: the services of commissioned medical officers will, if possible, be obtained for the purpose. The Government looks to the Civil Surgeon or to the Special Health Officer of the Municipality, when such an appointment has been made, to detect and immediately report to the Magistrate of the District any suspicious case that may occur. For collecting information, the agency of the municipal police, chaukidars and the conservancy staff should be fully utilized, and where necessary, strengthened.

7. The rules in force in Municipalities for reporting and dealing with cases of infectious disease apply only to cholera or small-pox, and are not sufficiently comprehensive in their nature: rules have accordingly been made under Act No. III of 1897 (Annexure A, Part II) providing for the reporting in municipalities, and also in cantonments, of suspicious cases of illness indicating the presence of bubonic plague, the segregating of patients, and the due disposal of the corpses of persons who have died of the disease.

These rules will be publicly notified in all places where they have effect; and the attention of all Magistrates is drawn to the fact that a breach of the rules is punishable under section 183 of the Penal Code. The military authorities will be asked to co-operate in giving effect to the regulations within the limits of cantonments.

8. *Relief Works.*—The occurrence of any case of plague on relief works will be immediately dealt with by segregation under the orders of the officers in charge of the works. Immediate notice of such case will be sent to the nearest Medical Officer, the District Engineer and to the Magistrate of the district. The associates of any person seized with plague symptoms will be segregated and placed in a gang by themselves. Special attention shall be paid to the food grain sold and water supplied on any work where a case of plague occurs.

9. *Railway Stations.*—The arrangements for detecting and dealing with cases, or suspected cases, of bubonic plague at railway stations in these Provinces have been recently revised: the rules on the subject are now re-issued as regulations under the new Act (Annexure A, Part III). It is not practicable to post a Medical Officer on duty at every railway station in the Provinces. The most that can be done is (1) to provide Medical Officers for special duty at stations on the border of the provinces or at important junctions with a view to the careful examination of passengers and the detection of suspicious cases, and (2) to direct subordinates of the Medical or Sanitation Department to be in attendance at the larger stations in the interior and at less important junctions to assist the Station Masters in watching for cases of plague. As regards the former measure, at Manikpur, Jhansi, Saharanpur and Ghaziabad, the duties of inspection and of carrying out the prescribed measures on detection of a case of bubonic plague devolve on commissioned Medical Officers, officers of the rank of Civil Surgeon, or Military Assistant Surgeons, assisted by female medical practitioners or female medical subordinates who will be stationed at those places for the purpose. At these four places, which command the approaches to the Provinces from Bombay and Karachi (the Government of India having made arrangements for examination at Sandikui), trains from infected quarters will be stopped, and the passengers required to alight for the purpose of examination by the Medical Officer. Hospital Assistants have been appointed by the Government at the stations of Agra, Allahabad, Benares, Cawnpore, Lucknow, Moghal Sarai and Muttra, whose sole duty is to watch the trains, and to take precautionary measures, pending the receipt of orders from the Civil Surgeon. The Sanitary Commissioner will now be requested to issue instructions to all District Superintendents of Vaccination to depute competent Officers to the stations, 32 in number, falling under the second class abovementioned, to assist the railway authorities. In the case of Rampur the authorities of the State will be asked to co-operate, and will, the Lieutenant-Governor has no doubt, render every assistance possible to the Sanitary Commissioner in making the necessary arrangements.

10. In order to supervise the arrangements generally and to assist the Civil Surgeons in their work of control, the railway system of the Provinces has been divided into three circles, and an Inspecting Officer has been appointed by the Government to each circle, whose duty will be to travel up and down the line, to visit the observation sheds, temporary hospitals and segregation huts, and to check the work of the Hospital Assistants and other subordinates.

11. On detection of a case at a railway station, the rules provide that the person believed to be infected with bubonic plague shall be placed under observation in a shed in the neighbourhood of the railway station, until under the orders of a superior Medical Officer, he is either discharged or removed for treatment to the temporary hospital as suffering from the disease. Temporary hospitals have been, or will now be, established at suitable places in the vicinity of, but at a proper distance from, all railway stations in the Provinces where officers of the medical or vaccination department have been posted, 43 in number: they are (with the exception of Manikpur, Jhansi, Saharanpur and Ghaziabad where special officers have charge,) under the direct management of the Civil Surgeon within whose district they are situated. It is understood that the railway authorities have provided observation sheds at all such places, but if in any case this has not been done, the necessary action should be immediately taken in the matter by the Inspector-General of Civil Hospitals. In addition to observation sheds and temporary hospitals, places of segregation should be provided for use by persons accompanying a patient treated in a temporary hospital who are detained by order of a Medical Officer.

The Inspector-General of Civil Hospitals should specify to each Civil Surgeon (where this has not already been done) the extent of the accommodation required in view of the above orders, the establishment to be maintained should occasion arise, and the furniture, &c., to be provided. The Lieutenant-Governor and Chief Commissioner leaves it to the Inspector-General to issue orders, in consultation with the Sanitary Commissioner, on other matters of details, such as the method of disinfecting houses and personal property, &c., and the provision of ambulances or *dhoolis*.

12. It is essential for the due apportionment of responsibility that the relative duties of the Government officials on the one

hand, and of the railway authorities on the other, should be clearly defined. Except in the case of Allahabad, all Civil Surgeons are Medical Officers of the railway passing through their districts and as such have, it is understood, taken certain precautionary measures in communication with the railway authorities. The precautions taken vary on different lines in extent and in their character: except in the case of the East Indian Railway, the Government has no detailed information on the subject before it. It is reported that, on the East Indian Railway, measures have been adopted—

- (1) For the inspection of trains by medical subordinates;
- (2) For the removal of a passenger from the train in a suspected case, for his isolation in hospital and for disinfection of bedding, burning of clothes, &c., when he leaves;
- (3) For the disinfection of the carriages used by a suspected person or his fellow travellers, and for telegraphing the address of all such fellow-passengers for the information of the local authorities of the places to which they are proceeding.

The Lieutenant-Governor and Chief Commissioner considers that to secure undivided control, together with greater efficiency in carrying out the operations, and to prevent the eluding of authority, the work detailed under heads (1) and (2), above, i.e., the medical inspection of passengers, the removal of persons suffering from bubonic plague from trains or railway premises and their subsequent treatment, should, wherever possible, be undertaken, with the co-operation of the railway authorities, by Government officials who will be held responsible by the Government for the due performance of their duties; and this view has been adopted in framing under the new Act regulations defining the duties of the special medical officers appointed to the four stations on the borders of the provinces. It is understood that in cases where a railway company has arranged for the medical examination of passengers, the duty is frequently undertaken by a medical subordinate in addition to his ordinary work, an arrangement which even on sanitary grounds appears to the Government to be objectionable. Moreover, as the Agent of the East Indian Railway Company points out, such examination can only be a cursory one. At the few places where a special medical officer has been employed by a railway company, e.g., Allahabad, he might remain on duty, as an additional precaution, to co-operate with the Government Official in the work.

The railway authorities of all lines on the other hand should be directly responsible for the performance of duties of the nature indicated under head (3) above, which clearly fall entirely within their province. Rules 39, 54, 56, 66, 67, 68, 69 and 82 of Annexure A deal more particularly with the duties of railway officials.

It is desirable that a railway carriage in which a case of plague has occurred should be kept unused, after being thoroughly disinfected, on a siding for ten days. The managers and agents of the various railway lines will be addressed on this subject, and also with regard to the method of disinfecting such carriages.

13. Under section 2 of Act No. III of 1897, it is open to the Local Government, which has been duly authorized to that end by the Governor-General in Council, to determine in what manner and by whom any expenses incurred in carrying out the prescribed measures should be defrayed. The expenses connected with the erection of temporary hospitals, the dieting and segregating of patients, the treating them in hospital and other similar measures will, till further orders, be borne, as the case may be, by the Government or by the local authority concerned. If in any case it is considered inequitable that the cost of disinfecting a house or taking other similar measures should be defrayed by the person benefited thereby, a special report should be made to the Government for orders. Magistrates are hereby authorized to incur any emergent expenditure that may be necessary from their contract grants, and to make advances to the medical officers or to the police for the purpose. Orders regarding the method of adjustment will be subsequently issued. The cost of erecting observation sheds in the neighbourhood of railway stations should, in the Lieutenant-Governor's opinion, fall upon the railway companies concerned.

14. Up to the present, the Sanitary Commissioner has personally investigated every case of bubonic plague that has occurred in the Provinces. His numerous other duties may not allow of his continuing to do so, but he will exercise general control over all the preventive and precautionary measures detailed in the rules annexed. He should be immediately consulted in all cases of difficulty or doubt by Civil Surgeons, who are primarily and directly responsible for the entire medical and sanitary arrangements, or by district officers; and any instructions issued by him should be promptly carried out.

15. Special attention is directed to the regulations and orders made by this Government under Act No. III of 1897, which form an Appendix to this Resolution, and which will remain in force until further orders. Copies of these rules, and translations into the vernacular, will be furnished to district officers for affixing to notice-boards at railway stations and in municipal towns and cantonments, and for distribution to the officials concerned. The Lieutenant-Governor and Chief Commissioner trusts that the

period during which it is necessary to enforce such orders in the interests of the inhabitants of these Provinces will not be long; but His Honor has no doubt that in view of the gravity of the situation the orders will be cheerfully obeyed by all classes of the community.

ORDERED.—Ordered that this Resolution, together with its annexures, be published in the *North-Western Provinces and Oudh Government Gazette* for general information.

Ordered also that a copy be forwarded for information and guidance, with a view to the necessary action being taken, to the Inspector-General of Civil Hospitals, N.-W. P. and Oudh, the Inspector-General of Police, the Sanitary Commissioner, all Magistrates of districts, Chairmen of Municipal Boards, Presidents of Cantonment Committees and Civil Surgeons: also to all Heads of Departments, Commissioners of Divisions and Chairmen of District Boards for information; also to the Deputy Adjutant-General, Bengal, for the information of the Lieutenant-General Commanding the Forces, Bengal, with special reference to paragraph 7.

Ordered also that a copy be forwarded to the Secretary to this Government in the Financial Department, with the request that the necessary orders regarding the debit of the charges referred to in para. 13, may be issued.

Ordered also that a copy be forwarded for information to the Manager or Agent of every Railway connected with these Provinces; also to the Lieutenant-Governor's Agent for Rampur, with the request that he will address the authorities of that State on the subject of the precautions to be adopted.

Memorandum by Sanitary Commissioner for the use of Police Officers and others in case of the occurrence of plague in villages or smaller towns.

1. *Symptoms of plague.*—The symptoms of plague are fever of recent commencement, violent headache, severe pain in the back and limbs, and lassitude. The glands in the groin, or in the armpit or neck, are generally swollen and tender, but this is not invariably the case. Cough and pain in the lungs are frequently observed, and delirium often comes on early in the disease. Death often occurs in two or three days.

Method of segregation of a person suffering from the above symptoms, and of his attendants.—A patient should be removed at once to a small "chuppar" hut, to be constructed of grass screens and erected well away from habitations. The site should, if possible, be shady, and near a well; this well should not be used by other people, if there are more than one well in the village. The police officer should tell off one or two of the sick person's relatives to stay with him, and should see that arrangements are made for the supply of food, fuel, &c.

3. *Method of segregation of the relatives and friends of such person.*—The other people living in the house or hut in which the sick person was attacked, or was living, should also be kept separate in another place, in "chuppar" huts to be erected well away from habitations: and similar arrangements should be made for their food water-supply, &c. Separate huts should be provided for males and females.

4. In all cases, the village Head-man and Chaukidar should take steps to see that these orders are carried out and the people kept separate.

5. A "chuppar" hut, after occupation by a person suffering from plague, should be burnt, and this should also be done to the charpoy upon which the person is carried to the hut. The well should, if possible, be completely cleaned out and disinfected.

6. *Method of disinfection of houses in which a death from plague has occurred.*—If the house be a small hut, and this can be done safely, it is best to burn the hut. But in the case of better houses, the following measures should be adopted:—

(a.) The earth of the floor should be dug out to a depth of two inches and removed to a spot well away from habitations.

(b.) Half a seer of sulphur should be burnt in each room, the doors and windows being closed during the operation.

(c.) The roof, floor and walls should be thoroughly lime-washed.

(d.) All the drains should be washed down with the best disinfectant available at the nearest dispensary or thana.

(e.) All doors and windows should be then thrown open, and the house vacated for fourteen days.

7. *Method of disinfection of clothes and bedding.*—The clothes and bedding of all segregated people, other than the sick person and his attendants, should be thoroughly boiled, and then spread out in the sun and wind for 48 hours. This should be done under supervision at the "chuppar" huts, immediately upon their arrival there: and large vessels and wood must be provided for the purpose. Clothing and bedding of small value should be burnt.

Upon the recovery, or the death, of a person suffering from plague, similar steps should be taken with regard to the clothes, &c., of such person, and of those in attendance on him or her.

7. *Disposal of bodies.*—When a person is found dead, or dies, and is believed to have been suffering from plague, the following measures should be taken:—

If a Hindu, the body should be completely burnt in an isolated place under supervision.

If a Muhammadan, the body is to be buried at least 6 feet deep and covered with quicklime. The place of burial should be well away from habitations and sources of water-supply.

ANTI-CHOLERAIC INOCULATIONS IN THE MANBHOOH DISTRICT.

BY SURGN.-CAPT. J. C. VAUGHAN, I.M.S

CHOLERA appeared in the village of Beliadih (three miles from the Jhalda Thana and 27 miles from Purulia), on the 10th July 1896, and the course of the outbreak was much as follows:—

On July 10th, four cases, two deaths, two remaining between July 10th and July 17th. There were four fresh cases and four deaths, which latter included the two cases reported as "remaining" on the 10th. Between the 17th and 23rd July there were 27 fresh cases with 24 deaths, among which latter were the two cases reported as remaining on the 17th. The five remaining cases died by the 25th. And between the 25th July and the 3rd August there were seven more deaths. This history is taken from the police reports, but personal investigation on the spot at once brought out the fact that the police report only contained a record of the fatal cases, or, rather, of those cases which eventually proved fatal, which was apparently what happened in most of the cases which occurred. We found, however, a few cases which had not proved fatal, and which were not included in the police returns above quoted, and of these we actually identified three. The villagers asserted that there were no others, and in the absence of further evidence we may say that, in the course of the outbreak, lasting from July 10th to August 3rd, there were a total of 45 cases with 42 deaths.

On the 25th of July, by which date there had been 38 fatal cases reported in 15 days, Assistant-Surgeon Gopal Chunder Mookerjee visited the village and inoculated 131 people, and on the 26th July he inoculated 53 more, making a total for this village of 184 inoculated persons. Of those inoculated on the 25th one was attacked with cholera on the 26th and recovered. After the inoculations were performed in the village, viz., between the 26th July and the 3rd August, there were seven fresh cases with four deaths and three recoveries, one of which latter was the inoculated man just referred to. The remaining nine cases were all in the uninoculated, and in every instance the house was shared by inoculated persons who invariably escaped. The details are given in the tables appended. In three instances, marked in the table with an asterisk, inoculated persons shared the house for several days with cholera-stricken sick who had been attacked before the date on which inoculations were performed in the village, and who eventually died.

Cholera broke out in the village of Belma, 13 miles from Purulia, in the beginning of July 1896. On the 10th July, 22 deaths were reported, and on August 4th, four deaths. These reports, as far as can be gathered, were incorrect, and the

Name of Place (Town, Bustee, Garden, Regiment, Jail, etc.) : Village Belaidih, Thana Jhaldah, District Manbhoom.

Date of Attack	Particulars regarding the individual attacked with cholera.				Total number of unvaccinated present on the date of attack.		Total number of people who arrived in the place during the preceding fortnight.		Particulars regarding the vaccinated people who lived in the affected house on the date of attack (including the patient, if unvaccinated).		Particulars regarding the inoculated people who lived in the affected house on the date of attack (including the patient, if inoculated), date of their inoculation and serial number in Inoculation Register.						Date of recovery of the patient.	Date of death.
	Name and Father's name, or Regimental number. Symptoms of the attack.	Caste.	Birth-place.	Date of arrival in the place.	In the whole place.	In the affected group of houses.	In the whole place.	In the infected group of houses.	Uninoculated (on date of attack).	Inoculated.	Name and Father's name, or Regimental number.	Sex.	Age.	Serial Number in the Register.	Date of 1st inoculation.	Date of re-inoculation.		
24-7-96	Sumitra Mahtain, wife of Haradhon Mahto.	Kurmi Mahto...	Beladilh	..	about 250	4	184	2	..	..	Sumitra Mahtain, wife of Haradhon Mahto.	F	18	..	..	..	..	26-7-96
24-7-96	Punia Mahtain, daughter of Bansi Mahto.	Do. ..	Do. ..	..	..	..	..	..	..	..	Punia Mahtain, daughter of Bansi Mahto.	F	5	..	..	..	..	27-7-96
					..	..	..	..	..	..	Wife of Bansi Mahto.	F	40	..	..	..	..
					..	..	..	..	..	..	Daughter of Bansi Mahto.	F	20	..	..	..	..
					..	..	..	..	..	..	Bansi Mahto Haradhon Mahto son of Bansi.	M	45	365A	25-7-96	..	..
					..	..	..	..	..	..		M	25	365	25-7-96	..	..
3 persons had died of cholera in that house previous to 25-7-96.																		
* Before 25-7-96	Agnu Kamar, son of Bhaduri Kamar.	Kamar	..	..	about 250	3	184	2	..	..	Agnu Kamar, son of Bhaduri Kamar.	M	16	..	..	..	..	After 25-7-96
After 25-7-96	Keshua Kamarin, wife of Bhaduri Kamar.	Do. ..	..	..	..	..	..	..	..	..	Keshua Kamarin, wife of Bhaduri Kamar.	F	40	..	..	..	..	After 25-7-96
					..	..	..	..	..	..	Wife of Gajraj Kamar.	F	14	..	..	..	..	After 25-7-96
					..	..	..	..	..	..	Gajraj Kamar, s. o. Bhaduri.	M	18	380	25-7-96	..	..	After 25-7-96
					..	..	..	..	..	..	Thelu Kamar, s. o. Bhaduri.	M	8	432	25-7-96	..	..	After 25-7-96

Name of Place (Town, Bustee, Garden, Regiment, Jail, etc.): Village Beladikh.

Date of Attack.	Particulars regarding the individual attacked with cholera.				Date of arrival in the place.	Total number of un inoculated present on the date of attack.				Total number of people who arrived in the place during the preceding fortnight.				Particulars regarding the un inoculated people who lived in the affected house on the date of attack (including the patient, if uninoculated.)		Particulars regarding the inoculated people who lived in the affected house on the date of attack (including the patient, if inoculated), date of their inoculation and serial number in Inoculation Register.						Date of recovery of the patient.	Date of death.	
	Name and Father's name, or Regimental number. Symptoms of the attack	Caste.	Birth-place.			In the whole place.	In the affected group of houses.	In the whole place.	In the affected group of houses.	Number of people who arrived in the place during the preceding fortnight.	Name and Father's name, or Regimental number.	Sex.	Age.	Name and Father's name or Regimental number.	Sex.	Age.	Serial Number in the Register.	Date of 1st inoculation.	Date of re-inoculation.					
*Before 25-7-96	Alhadi Murain, daughter of Madhu Mura.	Mura	Beladikh	..	Aboot 250	4	181	3	..	..	..	F	6	Alhadi Murain, d.o. Madhu. Mother of Madhu Mura. Wife of Madhu Mura. Daughter of do.	F	53	482	26-7-96	..	..	..	..	..	after 26-7-96
*After 25-7-96	Samia Murain, wife of Mangal Mura.	Mura	..	..	..	2	..	3	..	..	..	F	16	Samia Murain, w. o. Mangal. Mother of Mangal Mura.	F	50	..	..	..	..	..	..	..	after 26-7-96
27-7-96	Situ Mahto, son of Kenaram Mahto.	Mahto Kurmi	..	..	..	1	..	1	..	..	..	F	15	Wife of Situ Mahto	F	15	502	26-7-96	..	29 7 96	..	..	..
*After 25-7-96	Madhu Jolha, son of Farid Jolha.	Mahomedan.	..	..	..	4	..	3	..	..	..	M	25	Madhu Jolha, s.o. Farid. Wife of Madhu Jolha. Wife of Idoo Jolha	M	20	..	..	..	..	..	..	After 25-7-96	
												F	23	Idoo Jolha, s.o. Farid. Wife of Idoo Jolha	F	23	446	25-7-96						
												F	22	Jadu Jolha, s.o. Farid. Wife of Idoo Jolha	F	22	465	25-7-96						
												M	4	Sariat Jolha, s.o. Idoo.	M	4	447	2-57-96						

* It has been practically impossible at this interval of time to get the exact dates on which these people were attacked or on which they died. These villages are practically outside the reach of regular medical assistance, and the only village record in the weekly entry of these and similar occurrences in the village chest is a book.

first report reached me about the end of July. There were 137 inoculations performed in this village on the 3rd August 1896, after which date four more persons died, two of which only could be traced fully at the time of enquiry. All four were, however, uninoculated. The names of the untraced cases are to be found in the village records, but the villagers are not clear as to the cause of death. These two names do not occur in the inoculation register, and the villagers also state that these persons were not inoculated. The outbreak included some 67 cases and 37 deaths and about 30 recoveries. Scarcely any cases occurred after the inoculations were done, though the village was not clear of cholera till the middle of August.

Correspondence.

TROPICAL INTERMITTENT FEVERS.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—The succinct bibliographical sketch relating to the parasite of Laveran, the so-called plasmodium malariae, by Surgeon-Major Tull-Walsh, published in your issue for December 1896, is both instructive and interesting.

In the course of his remarks, Surgeon-Major Walsh refers to his own experiences in connection with the examination of malarial blood. He appears to have enjoyed unusually favourable opportunities for making such examinations. Not only amongst his own patients and in the wards of his colleagues at the Calcutta General Hospital has he pursued his investigations, but he has also had many opportunities, furnished him by Surgeon-Lieut.-Colonel Crombie, of examining blood actually containing the plasmodium malariae. And yet enjoying these advantages he states he has rarely met with the crescent form of the parasite, and never with flagellate threads. From this confession the most natural and most reliable inference is that these two forms of the plasmodium malariae were seldom present in the blood of patients who came under Surgeon-Major Tull-Walsh's observation: indeed, unless these types of the parasite were overlooked, no other logical conclusion is possible.

The pigmented malarial crescent, however, is a very striking object, and could not escape detection by anyone familiar with the appearance of an ordinary red-blood corpuscle, and to argue that an observer of Surgeon-Major Walsh's high attainments overlooked crescents, when actually engaged in searching for them, would be a waste of words.

Last year and the year before, when in Rangoon, I made several examinations of fever blood, but on no occasion did I find a pigmented malarial crescent. Having had this form of the parasite demonstrated to me some years ago in a specimen of malarial blood brought from Italy, and having renewed my acquaintance with it, through the courtesy of Dr. Manson, when in England in 1895, I was and am perfectly familiar with its appearance.

Surgeon-Major Tull-Walsh also states he has not always been able to find in malarial blood any bodies agreeing accurately with those described by Laveran and others; but I can go further and say that I have more often than not been unable to find any such bodies in the blood of patients assumed to be suffering from malarial fever.

In one of my cases of marked intermittent I found long motile chains of spores, but no plasmodium malariae.

A consideration of these facts furnishes support to the view held by many medical men, of whom I am one, that there exists in tropical countries one or more classes of fevers, intermittent as well as remittent in type, which are clinically indistinguishable from fevers associated with the presence of Laveran's parasite, but in the production of which the so-called plasmodium malariae takes no part.

The doctrine, therefore, that all malarial fevers are due to an invasion of the blood by Laveran's parasite cannot be accepted, for the term 'malarial fever' is of peculiar significance, and of a certainty comprises all intermittent and remittent fevers which result exclusively from residence in unhealthy tropical climates.

In connection with this subject it is perhaps desirable to raise a warning note against any departure from the traditional custom of giving full doses of quinine in tropical fevers. Although the detection of Laveran's parasite in the blood imperatively demands the liberal use of this drug, its equally free administration is, I would submit, in the present state of our knowledge, no less necessary in every form of fever exclusively due to living in a malarial climate.

OSWALD BAKER,
Surgn.-Lt.-Colonel, I.M.S.

Review and Notices of Books.

COMPRESSED AIR ILLNESS, OR SO-CALLED CAISSON DISEASE. By E. HUGH SNELL, M.D., B.Sc., LONDON. London: H. K. Lewis, 1896 (demy 8vo., pp. 252. 10s 6d.).

THE pathology of the disease resulting from working in compressed air has been keenly discussed by those who have had experience of it, and so far without any definite or universally accepted conclusions being arrived at. Dr. Snell's book, which is the first published in England, is a valuable contribution to the subject, and should help in some better agreement as to the pathology and treatment—more especially the preventive treatment—of the disease. Dr. Snell was medical officer to the famous Blackwall Tunnel under the Thames for two years, and altogether had over 200 cases of compressed air illness to treat among the men working in the Tunnel. Fortunately no death occurred, so he is unable to add to our knowledge of the morbid anatomy. An excellent account of all that is known about the disease, however—mainly derived from French and American literature—is given, and fifty illustrative cases are detailed, showing the different forms in which the men were attacked.

Most writers on the disease have attributed its causation chiefly to too rapid decompression or 'locking out' as it is termed, but Dr. Snell places this factor among the *minor* causes, together with age, the existence of organic disease, fulness of habit, drink and fatigue. The three principal factors he finds to be (1) the pressure itself of course; (2) the length of stay in the compressed air,—the lock tenders who are constantly entering and leaving it never suffer any ill effects; and (3) defective ventilation. This he has been the first to emphasise, and his figures show clearly that the amount of illness varied inversely with the amount of fresh air supplied to the compressed air chamber. As regards the pathology of the disease, he rejects the theories, suggesting exhaustion and carbonic acid poisoning as the cause; also those ascribing the symptoms to the mechanical congestion of the viscera; and he shows how the theory that the disease depends upon an increased solution by the blood of the gases of the compressed air, and the subsequent liberation of these gases on being removed, is remarkably adapted to explain the principal symptoms met with.

Compressed air illness is of course exactly the same in etiology, symptoms, &c., as what is known as *Diver's paralysis*, and so Dr. Snell is quite justified in speaking of it as *so-called* Caisson disease. It might indeed with just as much sense be called Tunnel or Diver's disease.

The treatment is of course mainly preventive. Selection of the workmen, reduction of the length of the shifts worked, ample ventilation (9,000 cub. ft. of pure air per head per hour at least), not too rapid decompression, rest, change of clothing and hot coffee after being 'locked out'; these are the principal preventive measures recommended. For curative treatment recompression is to be immediately resorted to in the 'medical airlock,' and when relief is obtained, the exit is effected slowly—the patient is allowed to 'leak out' in about three-quarters of an hour. Other treatment is symptomatic and not always satisfactory.

Dr. Snell is to be congratulated on having made such good use of his opportunities for studying this disease, and his book will no doubt in future be the standard guide for all medical officers and engineers in charge of works where the men have to carry on their duties in compressed air.

Appointments, Leave, &c.

BENGAL.

With effect from the forenoon of the 18th January 1897, Surgeon-Captain T. Grainger is appointed to act as Civil Surgeon of Champaran during the absence, on deputation, of Surgeon-Major R. R. H. Whitwell, or until further orders.

Surgeon-Lieut.-Col. O. Baker, London—Surgeon-Capt. W. J. Buchanan, Burdwan—Surgeon-Capt. H. Herbert, Bombay—Surgeon-Capt. A. W. T. Buist, Punjab—Charles W. Dulles, M.D., Philadelphia—Dr. R. T. Gravoly, Mahmuda—District Surgeon D. Rahman, 24-Porgunnahs—Surgeon-Capt. Moir, Calcutta—Kedar Nath Das, Calcutta—Surgeon-Major T. H. Walsh, Midnapore—Brigade-Surgeon-Lieut.-Col. McLeod, London—Surgeon-Captain A. O. FitzGerald, A.M.S., Rangoon.

Original Communications.

NEW BYE-LAWS ON HOUSE SANITATION IN BANGALORE.

BY SURGEON-MAJOR RONALD ROSS, I.M.S., D.P.H.,
Officiating Residency Surgeon and Chairman, Health Committee, Bangalore.

ONE of the chief causes of bad sanitation in India is that municipal and cantonment authorities do not provide and enforce proper bye-laws for the regulation of latrines and drains in private houses, though they generally have ample powers to do so. The consequence is that the latrines and drains of native houses and those used in the houses of Europeans for native servants are usually of the worst description, the latrines being either rough cess-pits or mere areas of ground surrounded by mud-walls, while the drains are little better than furrows in the ground supported by a few stones. At the same time dust-bins are rarely made, and all sorts of refuse, garbage, horse dung, &c, are merely heaped in a convenient spot in the yard or compound. As a result the ground becomes soaked with offensive matter, and, when it rains, much of this matter may percolate into wells, which by some species of fatality generally appear to have been sunk as close to the latrines as possible. The naked feet of natives must in this manner be frequently polluted by excreta; while it is no uncommon thing to see children, not only of natives, but of poor whites and Eurasians playing in or near pools of sewage which has stagnated by reason of the ineffectual drains employed.

Assuming as an axiom that the sanitation of the dwelling-house is the first law of hygiene, we must often have been struck with the thought that while almost all municipalities continue to cry out for expensive water-supply and drainage schemes, they should as a rule do so little in respect to that which lies fully within their power to do, namely, to construct a proper code of bye-laws in reference to house sanitation and to see that it is enforced. Almost every municipality has full powers on the following four points:—

A.—To require by notice that the owner of any house shall build or re-build latrines and drains in such manner as the Commissioners or Chairman shall direct; and in default of the work not being done by the owner, to have it carried out by municipal agency and to recover the cost from the owner.

B.—To punish by fine an occupier who permits his premises to be filthy.

C.—To punish by fine an occupier who

(a) keeps his filth for more than twenty-hours,

(b) does not keep it in a proper receptacle.

D.—To pass all bye-laws necessary to preserving cleanliness.

The first rule, frequently if not generally, becomes more or less of a dead-letter because the Chairman not being a sanitary authority often does not know in what manner latrines and drains should be made; and also because the construction of such for private persons by municipal agency and the subsequent recovery of the cost from the owner, may be after litigation, can scarcely be said to be a facile process. Hence the owner (who is almost always a native) is left entirely to his primeval instincts and takes no thought whatever about the sanitary arrangements of his property. The second rule which applies to houses being kept clean by the occupier, becomes equally disregarded, because unless proper latrines and drains are provided by the owner the occupier finds it practically impossible to keep his house clean. The third rule is generally infringed because nobody knows what the word "proper" exactly means; while the fourth provision is not taken advantage of because the preparation of a code of bye-laws on the subject is exceedingly difficult, and because house-owners, who have considerable influence in municipalities, are generally averse from the expenditure which such laws would force upon them. The result is as described above. Of course there must be some municipalities where a better state of things prevails; but I may say that I have lately had occasion to examine many codes of bye-laws without having seen good regulations on the important subject under reference.

The object of making bye-laws in this connection is to enable a municipality to dispense with the cumbersome process of carrying out the work for a house-owner and then recovering the cost from him. It is necessary to be able to punish an owner forthwith, if after sufficient notice he has not given himself the trouble to see to the business. This power can always be obtained by bye-laws, provided that the bye-laws specify sufficiently clearly what is and what is not to be done; and will, if the power be courageously acted up to, enable a Health Department to exert a great deal of control. In my experience house-owners in India will, as a rule, do absolutely nothing as regards sanitation unless penally driven to it. Where a man knows that the municipality must make his latrines and drains for him he sits down in the comfortable assurance that the municipality is not likely to trouble him; on the other hand, where he knows that he is at any moment likely to be brought into court and fined ten or twelve rupees because his latrines and drains are not in order, his former condition of blissful *nirvana* is likely to be replaced by a very active if somewhat unwilling ardour for sanitation.

I venture then to publish our new bye-laws on the house-sanitation in the hope that many

civil medical officers throughout the country will be able to exert their influence on municipal and cantonment committees with a view to the creation of similar regulations. District medical and sanitary officers are generally *ex-officio* Commissioners, and can, if they like, get things like this carried through. But they must expect difficulties if not resistance. For example, our bye-laws required a great deal of pushing and much revision. They were first proposed by the Health Committee of the Bangalore (Station) Municipality; then passed by the Municipal Commission; then revised because the Resident in Mysore feared they would be oppressive on the poorer house-owners; then passed again (with much difficulty and after having once been thrown out) in an amended form; then revised again by the Resident (much to their advantage); and then finally accepted by the Commissioners. It took me nearly ten months to "get the bill through," but this having been accomplished at last, I now venture to express a hope that the case of Bangalore will afford a useful precedent to other municipalities.

It will be observed that the code ordains nothing very elaborate or beyond the means of the poorest people, but still ensures, if properly enforced, that enough shall be done to keep filth, rubbish and sewage in proper vessels and drains. Bye-law (A) regulates the works which must be done by the owner after due notice by the Municipality. While we have purposely refrained from exacting any specific form of latrine or drain, we have put things so that the essential sanitary rules shall be observed. Thus, in order that the excreta shall always fall within a vessel, a sitting or squatting platform is provided, which, however, may be made in any way so long as it is effective. We use here a stone slab supported on uprights; but slate, wood or iron may also be employed, and Horbury or Donaldson's patents will of course be legal. Similarly the section and structure of drains are not specified; but they must be such as to prevent sewage from overflowing or soaking into the ground, and to ensure that it shall be discharged in a proper manner (A, 6). Clause 7 refers to bath and cooking water, and regulates simply that this shall not soak into dwelling-houses, while it may be discharged upon gardens for instance. In order to prevent the unsightly pollution of streets by house sewage flowing down external walls and plinths, clause 4 has been given. Clause 8 orders that a separate entry shall be made for scavengers (when required by notice) in order to obviate the caste prejudice against such entering by the front door. Unfortunately it has not been possible to extend all of these to the poorest houses as yet, though it is hoped that this will be done hereafter.

Under our section 155 (Bye-law A) it is not possible to order new drains to be built when required, this however can be done legally under

our section 132 which ordains that no house shall be kept in a filthy or unwholesome condition. It is required only to define "filthy and unwholesome," and this is done under Bye-law (B).

Bye-law (C) is really a conservancy bye-law operative on the occupier. When the owner has provided a proper platform and proper drains, &c., the occupier must provide a proper moveable vessel to be placed under the platform. He must also provide, if necessary, a urinal (clause 2) and a dust-bin (clause 3). Perhaps clause 3 ought to have been put under Bye-law (B.) The nature of the urinal and dust-bin is purposely not specified.

The simplest kind of latrine consonant with these rules consists of:—

- (a) a platform,
- (b) a receptacle,
- (c) a shallow sand-cistern about 4' x 4' in area and 9" deep, built of water-tight masonry under the platform and receptacle, and kept filled with sand. The idea of this was suggested to me by Surgeon-Colonel King's house sewage-filter.

It will be seen from the accompanying plan and section (being a copy of what is served on the house-owners here), that all excreta and fluids (such as ablution water and urine) which escape the receptacle must fall upon the sand in the sand-cistern. There, as a matter of fact, most of it is absorbed by the sand or evaporates away; but, in case of an excess of fluid or of flooding by rain-water where there is no roof to the latrine, the bottom of the sand-cistern should be connected with a latrine-drain built in accordance with (A, C). Thus the sand-cistern becomes practically a sewage filter. After long consideration of the difficult subject of latrines for natives, I am of opinion that every such latrine whether public or private should be built not on a flooring of asphalt, flags or cement, which retain stinking fluid, but upon a sand-cistern as described above, which absorbs it. Of course the sand may be changed as often as we please; as a matter of fact microbial dissipation is so strong even in sand in this country that change is comparatively seldom required. The principle is applicable to all kinds of good interception latrines.

I think that the rules with or without special modifications will be found useful in all municipalities, presidency and mofussil. In conclusion, the question arises whether such rules should not form part of an Indian Health Act (which appears to be called for on other grounds) instead of being left to municipalities who, as experience shows, are apt to neglect the subject.

BYE-LAWS.

(A). Whereas by section 155 of the Bangalore Municipal Regulations the control of all privies or latrines and of all branch drains as well within

as without the lands or buildings to which they belong is vested in the Commissioners; and by section 224 of the said Regulations the Commissioners are empowered to make bye-laws for carrying out any of the purposes of the said regulations; the following bye-law is hereby made subject to the confirmation of the Resident in Mysore:—

1. Every place, other than a water-closet or bath-room, situated within any house, building or enclosure, and habitually used for the purposes of nature or for keeping human excreta shall be considered to be a latrine within the meaning of this bye-law.

2. The provisions of sections 3 and 4 of this bye-laws shall extend to all latrines and drains which are private property. The provisions of sections 5, 6, 7 and 8 shall extend only to such latrines and drains hereinbefore mentioned as belong to or are maintained for the use of any house, building or enclosure which is assessed in the municipal books at an annual valuation of Rs. 200 or more.

3. Every latrine shall be provided with a seat or platform so made as to compel the excreta to fall entirely into a suitable receptacle placed beneath.

4. All drains emerging from any house, building or enclosure and passing down the external surface of plinths or walls facing any public street shall consist of pipes or be covered with masonry.

5. The floor of every latrine shall be so sloped, drained, and constructed as to prevent fluid from being retained on its surface, and from soaking into the floor, ground, plinth or walls of the latrine.

6. All drains, or continuations of drains, for the removal of fluid from any part of a latrine, or of fluid which is contaminated, or likely to be contaminated, with animal refuse, shall be sufficiently large, well laid and water-tight to prevent their contents from overflowing, or stagnating, or soaking into any ground, floor, plinth or wall; and shall discharge in one of the following ways, viz.:—

(a) into a moveable receptacle of such proper shape and size as entirely to receive and retain all the fluid, and not cracked, broken, perforated, rotten or pervious to fluid:

(b) into a receptacle covered with a moveable lid, and of such proper shape and size as entirely to receive and retain all the fluid, and so constructed as to prevent the fluid from soaking into any ground, floor, plinth or wall:

(c) into a receptacle, not less than four feet square in superficial measurement and nine inches deep, so constructed as to prevent the fluid from soaking into any ground, floor, plinth or wall, and filled with so much sand as will absorb all the fluid:

(d) through such filtering material as the Commissioners may deem sufficient, into an open public drain notified by the Commissioners as being set apart for the purpose:

(e) into a closed drain notified by the Commissioners as being set apart for the purpose.

7. All drains for the removal of fluid from bath-rooms, cooking rooms, sculleries, mills and factories shall be sufficiently large, well laid and water-tight to prevent their contents from overflowing, stagnating or soaking into the foundation, floor, plinth or wall of any dwelling-house; and no such drain shall discharge into any street, or into any drain or water-channel except such as the Commissioners shall have notified as being set apart for the purpose.

8. Every house, building or enclosure which has a latrine shall be provided with a separate entrance for the entry of scavengers for the purpose of cleaning the latrine.

9. If the owner of any house, building or enclosure neglects within eight days from the receipt of a notice issued by the Commissioners to comply with all or any of the provisions of this bye-law, he shall be liable, on conviction before a Magistrate, to a fine which may amount to ten rupees for every day that such neglect may be continued after the expiration of such notice.

(B). Whereas by section 132 of the Bangalore Municipal Regulations it is required, on pain of the penalty therein provided, that no house, building or enclosure shall be permitted to be in a filthy or unwholesome condition, and by section 224 of the said Regulations the Commissioners are empowered to make bye-laws for carrying out any of the purposes of the said regulations or generally for preserving order and cleanliness in the station; and whereas the Commissioners deem it advisable to define certain general requirements in the absence of which any house, building or enclosure must be considered to be in an unwholesome condition; the following bye-law is hereby made, subject to the confirmation of the Resident in Mysore:—

1. The owner of every house, building or enclosure which is assessed at an annual valuation of Rs. 200 or more, shall provide such drains as may be necessary for the removal of all fluid which is or is likely to be contaminated with animal refuse, or which escapes from bath-rooms, cooking rooms, sculleries, mills and factories.

2. The occupier of any house, building or enclosure shall not allow the drains thereof to become so obstructed as to cause their contents to stagnate or overflow.

3. Where sand or filtering material is required under clause 6 (c and d) of Bye-law No. (A), sufficient shall be provided by the occupier for the purposes indicated; and the same shall be changed whenever it becomes offensive.

4. If the owner or occupier, as the case may be, of any land, building or enclosure neglects within three days from the receipt of a notice issued by the Commissioners to comply with all or any of the provisions of this bye-law, he shall be liable, on conviction before a Magistrate, to a fine which may amount to ten rupees for every day that such neglect may be continued after the expiration of such notice.

(C). Whereas by section 107 of the Bangalore Municipal Regulations it is required, on pain of the penalty therein described, that no dirt, dung, night-soil, filth, or other noxious or offensive matter shall be kept in or about any house otherwise than in some proper receptacle; and by section 224 of the said regulations the Commissioners are empowered to make bye-laws for carrying out any of the purposes of the said regulations, and generally for preserving order and cleanliness in the station; and whereas the Commissioners deem it advisable to define generally for what kind of receptacles shall be considered proper for the purposes aforesaid; the following bye-law is hereby made subject to the confirmation of the Resident in Mysore:—

1. Every latrine as described in Bye-law No. (A) shall be provided with a suitable receptacle placed beneath the seat or platform described in clause 3 of Bye-law No. (A). The receptacle shall be a moveable vessel of such proper shape and size as entirely to receive and retain all the excreta, and not cracked, broken, perforated, rotten or pervious to fluid.

2. Every latrine shall be provided, if so ordered by the Commissioners by notice, with a moveable vessel not cracked, broken, perforated, rotten or pervious to fluid, for the purpose of receiving and retaining urine.

3. Every house shall be provided with a dust bin.

4. No filth, rubbish, ordure or other offensive matter shall be kept otherwise than in one of the receptacles described in this bye-law; and no human excreta shall be kept otherwise than in the receptacles described in clauses 1 and 2.

5. If the occupier of any land, building or enclosure neglects to comply with all or any of the provisions of this bye-law, he shall be liable, on conviction before a Magistrate, to a fine which may amount to ten rupees for each offence.

NOTES ON STONE IN THE BLADDER.

By BRIG.-SURGN.-LIEUT.-COL. D. F. KEEGAN, F.R.C.S.,
I.M.S. (Retired).

I.—LITHOLAPAXY IN GIRLS AND WOMEN.

THE great majority of vesical calculi which are met with in girls and women are best removed by litholapaxy. I take it for granted that no one now-a-days would dream of employing the ancient method of rapid dilatation of the urethra, with subsequent extraction of the calculus, if called to treat a young girl, the subject of stone in the bladder, unless, indeed, the calculus were

a very, very tiny one. Dilatation of the urethra with extraction was always a somewhat rude surgical procedure even in adult females, but there was much to be said for it in the days which preceded Bigelow's brilliant innovation in the treatment of stone in the bladder. Any surgeon, however, who, at the close of the nineteenth century, adopts as a routine practice the old method of rapid dilatation of the female urethra with extraction is behind the age and is hardly to be tolerated. There remain two other methods of removing a stone from the female bladder—*viz.*, vaginal lithotomy and suprapubic lithotomy; but the cases in which they should be employed are few and far between. In most surgical text-books the subject of vesical calculus in the female is usually dismissed in a very cursory and somewhat perfunctory fashion. The scanty attention accorded to it is in some measure due to the fact that stone is so rare in girls and women as compared with its frequent occurrence in boys and men, and partly to the ease and safety with which a stone is removed from the female bladder as compared with the difficulties and dangers which surround its extraction from the male bladder. It falls to the lot of very few surgeons in Europe to treat many females for stone in the bladder, and hence few are warranted in expressing any very decided opinion as to the comparative advantages of the different methods of dealing with stone in females. Mr. Cadge, in his admirable lectures on the surgical treatment of stone in the bladder delivered at the Royal College of Surgeons of England in June, 1886—lectures, which, by the way, everyone interested in the surgery of the urinary organs would do well to study—stated that in 1125 operations for stone in the bladder at the Norwich Hospital there had been only 50 in females, and that, in his own experience of 300 cases of vesical calculus, he had only met with six in the female. Surgeon-Lieutenant-Colonel Freyer in 864 cases of stone in the bladder has met with only 17 cases in females. Brigade-Surgeon-Lieutenant-Colonel Forbes Keith amongst 1,993 cases of stone in the bladder which came under his care in the Civil Hospital, Hyderabad, Sindh, treated 57 cases in females. During the last fifteen years about 900 patients have been admitted into the Indore Hospital, Central India, for stone in the bladder, and there were but 20 females amongst this number. From these figures, which are sufficiently large to warrant safe deductions, we may conclude that stone in the bladder is about thirty times as common in the male as it is in the female. Appended is a table giving the particulars of the twenty cases of stone in females admitted into the Indore Hospital, and a glance at it will show that 18 out of the 20 were treated by litholapaxy. The last three operations recorded in the table were carried out since I left India. To show what an eminently satisfactory operation litho-

lapaxy is in females of all ages, I will very briefly give the histories of some of the more interesting cases in this series.

Case 5.—A Brahmin girl, aged four and a half years, was brought to the Indore City Dispensary on October 17th, 1887, suffering from complete retention of urine. Her friends gave the following history: "The girl has laboured under stone symptoms for the last two years, and latterly these symptoms have become aggravated, so much so that she cries and rolls on the ground from paroxysms of pain at each effort of micturition; passes urine about thirty times in the twenty-four hours; was seized with retention of urine early this morning." The native assistant at the dispensary, finding the stone firmly wedged in the urethra, at once sent the girl to me at the hospital. Chloroform having been administered, I returned the stone into the bladder with some difficulty, and easily disposed of it by means of a No. 6 lithotrite, which I passed into the bladder twice. A No. 10 evacuating catheter passed readily into the bladder, and the operation lasted twelve minutes. The stone, a mulberry one, consisted of oxalate of lime and uric acid and weighed twenty grains. Next day she was walking about the ward of the hospital, and the day after she had no urinary symptoms and passed urine seven times in the twenty hours. She went home on October 21st, having been in hospital only four days. These mulberry calculi grow very slowly as a rule. Nearly half of this patient's young life had been spent in pain and misery. For how much longer she might have suffered had she not been seized with retention of urine, it is difficult to surmise.

Case 6.—A Rajput girl, aged three years, was admitted into hospital on October 29th, 1887, with well-marked symptoms of stone in the bladder of one year's standing. Her condition was most pitiable. She was thin and anæmic. For six months she had suffered from great irritability of bladder accompanied by prolapsus and at each effort of micturition, having no rest at night, and passed urine about forty times during the twenty-four hours. On October 30th I placed her under the influence of chloroform, and passing in a No. 6 lithotrite seized a large stone readily. The bladder resisted, the presence of the lithotrite and spasmodic contraction of the viscus was very violent, although she was deeply under the influence of the anæsthetic. A No. 8 evacuating cannula passed readily into the bladder. Whilst working the lithotrite and aspirator my assistant pressed the wall of the urethra against the instruments so as to retain as much urine in the bladder as possible. Nevertheless, a good deal of fluid leaked out of the bladder. I was obliged to use the lithotrite on six separate occasions, and after three-quarters of an hour's work I had extracted the entire calculus. The debris, when dried, weighed 183 grains, and consisted of phosphates and a small nucleus of oxa-

late of lime. The straining and the very irritable state of the bladder made the operation a very prolonged one. The after-history of this case was briefly as follows:—On October 31st the patient did not cry when passing urine; there was no prolapse of the anus; she slept well; had passed urine seven times since the operation, and had wetted her bed-clothes. There was no pain on pressure over the region of the bladder. On November 1st the morning temperature was normal. The patient had slept soundly during the night. On the 2nd she ate well and had sound sleep, had full control over the bladder, and passed urine eight times in the twenty-four hours. On the 3rd she played about the hospital grounds and seemed quite happy. The change in her condition in so short a time was very remarkable. Her mother took her home in the evening.

Case 8.—A low-caste Hindu brought his daughter, aged seven years, to the Indore Hospital on March 12th, 1889, suffering from very urgent stone symptoms. She had suffered for two years, and as she had lost control over the bladder was in a very miserable condition. She was at once placed under the influence of chloroform, and I struck a large, soft stone, which I crushed with a No. 6 fully fenestrated lithotrite. The lithotrite was introduced on nine separate occasions owing to the straining of the bladder. No difficulty was experienced in passing a No. 14 evacuating catheter, and on two occasions I passed a No. 15 straight catheter, to which I attached a Berkeley Hill's aspirator. The debris weighed 225 grains and the operation lasted fifty-seven minutes. The girl resided in the city of Indore, and her father took her home the same evening much against the advice and wishes of my assistant, saying, as he left the hospital, that he could not afford to spend any more time on his daughter. If his son had undergone a litholapaxy, he would doubtless have spent three or four days in looking after him in the hospital. After all, there is much to be said for woman's rights, and even something for the new woman. My assistant paid the girl a visit four days after the operation and found her playing outside her hut. She had regained perfect control over the bladder and was perfectly well.

Case 16.—A young woman, aged eighteen years, a Bhil by caste, came to the Indore Hospital on July 28th, 1893, with urgent symptoms of stone in the bladder, which had existed for three years. I broke the stone—a hard one—with a No. 15 lithotrite and finished the operation by means of a No. 13 and a No. 8 lithotrite. Evacuating catheters, Nos. 15, 16 and 17, were employed. The patient strained violently during the greater part of the operation, and the fluid in the bladder was rapidly expelled, although my assistant pressed the urethra against the lithotrite, while I continued the crushing process.

TABLE I.—SHOWING PARTICULARS OF TWENTY CASES OF STONE IN THE BLADDER IN FEMALES TREATED IN THE INDIAN CHARITABLE HOSPITAL, CENTRAL INDIA, BETWEEN MARCH, 1882, AND DECEMBER, 1895.

No.	Ago (years.)	Caste.	Date of operation.	Nature of operation.	Time occupied by operation in minutes.	Number of lithotrite used.	Number of catheter used.	Number of times lithotrite was introduced.	Number of sittings.	Composition of stone.	Duration of disease in months.	Weight of stone in grains.	No. of days in hospital after operation.
1*	4	H.	23-3-'82	Litholapaxy.	No record.	7	No record.	No record.	1	No record ..	No record.	No record.	2
2*	40	H.	1-10-'82	"	"	No record.	"	"	1	Phosphatic ...	"	"	12
3*	80	H.	18-1-'86	"	67	15	16	6	1	Fawn-coloured uric acid with covering of oxalate of lime.	24	395	11
4*	5	H.	27-3-'86	"	33	7	7	4	1	Uric acid ...	12	23	2
5*	4½	H.	17-10-'87	"	12	6	10	2	1	Oxalate of lime and uric acid.	24	20	4
6*	3	H.	30-10-'87	"	45	6	8	6	1	Phosphates with nucleus of oxalate of lime.	12	183	3
7*	30	H.	2-6-'88	Vaginal lithotomy.	No record.	...	...	...	...	Phosphates and urates.	36	1140	24
8*	7	H.	12-3-'89	Litholapaxy	57	6	6, 7, 8, 12, 14 & 15	9	1	Phosphatic ..	24	225	1
9†	7	H.	19-4-'89	Urethral lithotomy.	No record.	...	...	...	...	Phosphatic ...	60	335	54
10*	3	H.	29-11-'90	Litholapaxy	48	4 & 6	6	5	1	Phosphates and urates.	15	72	21
11*	50	H.	28-12-'90	"	14	10½	16	3	1	Fawn coloured uric acid with phosphates.	12	11	
12*	7	H.	7-1-'91	"	49	5½ & 9½	10	7	1	Urates and phosphates.	12	260	3
13*	4	H.	15-4-'93	"	89	7, 7½ & 10½	10 & 12	14	1	Fawn-coloured uric acid.	30	391	8
14†	40	H.	17-4-'93	"	21	1½ & 15	18	3	1	Phosphates with uric acid nucleus.	24	211	6
15*	5	H.	30-4-'93	"	43	4 & 6	6, 7 & 8	5	1	Oxalate of lime, phosphate of lime and urates.	36	86	4
16*	15	H.	28-7-'93	"	70	8, 13 & 15	15, 16 & 17	9	1	Fawn-coloured uric acid.	36	702	5
17*	5	H.	18-12-'93	"	38	5 & 7	6 & 8	7	1	Uric acid and phosphates.	24	86	2
18*	60	H.	11-5-'95	"	34	7, 10, 15 & 19	14 & 29 French.	7	1	Fawn-coloured uric acid.	36	480	3
19†	5	M.	12-11-'95	"	25	4 & 8	6 & 8	4	1	Fawn-coloured uric acid.	24	139	3
20*	9	H.	30-12-'95	"	17	8 & 10	14	2	1	Phosphates ...	6	120	3

* Successful.

† Relieved.

I was compelled to introduce the lithotrite into the bladder on nine different occasions, and the operation was therefore a prolonged one lasting seventy minutes. The debris consisted of fawn-coloured uric acid, and when dry, next day, weighed 702 grains. There were no untoward symptoms of any kind after the operation, and she remained only five days in hospital.

There are but two cases in the table appended which were not amenable to litholapaxy, and their histories are briefly the following.

Case 7.—A weak anæmic woman was admitted into the Indore Hospital on June 1st, 1888, with symptoms of stone in the bladder of three years' standing. She gave her age as thirty, although she looked more like fifty years. During the previous six months she had suffered from constant dribbling of urine and her life was a burden to her. Next day, having been placed under the influence of chloroform, a stone was found bulging into the vagina. On passing a small steel sound into the urethra it at once impinged on the stone, which was pressing against the meatus. I tried to pass a small lithotrite, and in endeavouring to do so the urethra gave way at the meatus and the rupture extended backwards for half an inch, so thin and weak had the urethra become by the constant pressure exerted on it by the stone. I therefore extended the rupture by a clean cut of a scalpel for another inch, which included the neck of the bladder, and exposed the stone, which I then found was tightly grasped by the bladder and was perfectly fixed in position. I now endeavoured to crush the stone with a large lithotrite, but this I found not feasible, as there was no room in which I could work the instrument. I accordingly extracted the stone by means of an ordinary lithotomy forceps, but this I accomplished with very great difficulty. Indeed, I was obliged to peel the bladder from the stone by means of a broad director, while my assistant made traction with the lithotomy forceps, so intimately united were the bladder and stone. On extracting the calculus, which weighed 1,140 grains and was composed of phosphates and urates, I found it to be a perfect cast of a very contracted female bladder, and on the inferior and posterior aspect of the stone were two well-marked deep depressions, or blind holes corresponding to the openings of the ureters into the bladder. I then washed out the bladder with an irrigator and brought the margins of the incision together with stout ligatures. The after-history of this case was as follows:—On June 4th the ligatures were in position; the wound looked healthy; and urine passed drop by drop. On the 8th one or two of the ligatures near the meatus had given way; the remainder of the incision co-adapted well. On the 13th the greater part of the incision was well joined; there was some gaping near the meatus; the dribbling of urine was much less. On the 16th

the patient had more control over the bladder; the anterior portion of the wound in the urethra was refreshed by the scalpel and new sutures were introduced. On the 19th the urine could be retained for two hours at a time. The patient, however, occasionally passed a small quantity of urine involuntarily. On the 22nd urine was passed voluntarily three times during the day and twice during the night. There was no dribbling of urine during the day-time, but sometimes a few drops of urine were passed in her sleep. The patient's health was much improved. On the 24th the urine could be retained for four hours at a time and was passed only twice during the night. The patient's husband, who accompanied her to the hospital, insisted on taking her home as the monsoon had set in, and he was obliged to look after his fields and the sowing of crops. The patient promised to return to the hospital in a month's time. As a matter of fact this woman never did return to the hospital for treatment, but I have little doubt that she ultimately regained perfect control over the bladder. I question very much if a suprapubic lithotomy would have given any better results than those which followed the operation I was forced to perform. A suprapubic lithotomy in such a case would have been a very difficult operation, for no water could have been injected into the bladder, and fixed as the stone was there would have been considerable danger of wounding the peritoneum in extracting it by the suprapubic route. Indeed, the peritoneum in a case of this kind, where the size of the bladder had been reduced to the dimensions of a small pear, would have descended much lower than it usually does. I showed the calculus removed from this patient's bladder to the Fellows of the Medical Society of London in March, 1891, and a more perfect specimen of its kind does not exist.

Case 9.—A Hindoo girl, aged seven years, was admitted into the Indore Hospital on April 19th, 1889, in a most miserable condition, suffering from stone in the bladder and incontinence of urine. Her mother, who brought her to the hospital, stated that the girl had suffered from stone symptoms from her infancy. Placing her at once under the influence of chloroform I found the calculus sticking in the meatus of the urethra. There was a large hole in the bladder into which I could readily insert my index finger. This hole was about an inch from the meatus. I therefore slit up the urethra, and seizing the stone with a lithotomy forceps endeavoured to extract it. In doing so the stone, a phosphatic one, parted in two, and the anterior half came away in the jaws of the forceps. The posterior half of the stone I found firmly attached to the bladder wall and I removed it by means of the scoop and forceps. The bladder and vagina were well washed out by an irrigator and she was removed to bed. The stone

weighed 335 grains—a large one for a child of her age. Her health improved after the operation, and with care and rest and good feeding she rapidly grew plump. On May 24th I performed an operation for vesico-vaginal fistula. Such operations in young girls are extremely difficult, owing to the limited space afforded for manipulating instruments, and in order to give myself more room I divided the perineum almost to the anus. Silver wire sutures were employed; a gum elastic catheter was retained in the bladder, and the legs were tied together with bandages. On the 27th the perineal incision and wounds of the urethra and bladder had seemingly healed. Urine was passed by catheter. On the 30th the patient's health had much improved; when the catheter was removed for a few minutes there was dribbling of urine. On June 3rd the catheter was removed for an hour; meanwhile, urine was passed by stream. On the 9th the sutures were removed; urine passed by stream, and the catheter was removed for good. On the 13th the urine could be retained for half an hour, and then was passed by stream, but a few drops came by vagina. On examination it was found that a pinhole existed in the vesico-vaginal septum. The patient's mother, becoming weary of staying in hospital, took the child home, promising to return some months later. She, however, did not keep her promise. Bearing in mind the child's age, I am inclined to think that she ultimately made a complete recovery, but to be on the safe side I have noted the result as "relieved" and not successful.

To recapitulate: adding together Surgeon-Lieutenant-Colonel Freyer's cases and those admitted into the hospitals at Hyderabad, Sindh and Indore, Central India, we get a total of 3,757 cases of stone in the bladder in patients of all ages and of both sexes. Amongst this number there were 94 females, 88 of whom were treated by litholapaxy, with a successful result in 87 cases. Brigade-Surgeon-Lieutenant-Colonel Forbes Keith treated all his female stone cases, 57 in number, by litholapaxy and lost only one patient. Surgeon-Lieutenant-Colonel Freyer treated 13 female patients out of a total of 17 by litholapaxy, and in no case did he perform a suprapubic lithotomy on a female. A glance at Table I should convince the most sceptical that litholapaxy is capable of dealing most successfully with large stones in young girls and women, but judging from much that has been written about litholapaxy in boys, I am quite prepared to see it gravely stated that litholapaxy should be adopted only in cases of small calculi occurring in girls, and that when the stone is of considerable size, it should be removed by a suprapubic lithotomy. Such is certainly not my opinion. I think that in these days of aseptic surgery a vaginal lithotomy in an adult female will offer quite as good a chance of success as a suprapubic lithotomy. The clean incision

made by a scalpel is readily stitched together, and if the vagina be rendered aseptic by filling it with iodoform gauze and a soft catheter be tied in the bladder perfect union should take place in four or five days. But the perfection of treatment for the vast majority of calculi in girls and women is unquestionably litholapaxy, and it is the ideal to which we should aspire if we are to obtain the maximum of success. For those who are being continually afforded opportunities of crushing stones in boys and men, the operation of litholapaxy in girls and women is an extremely facile one. The route to the bladder in females is short and straight; there is no hypertrophied prostate to bar the way of the lithotrite into the bladder not a post-prostatic pouch, that bugbear to successful litholapaxy in males to be dealt with, and pouched bladders must be rare indeed in females. The instruments employed are the same as we use in boys and men, and as cases of stone are so rare in girls and women, it would scarcely be worth while to fit oneself out with a supply of short evacuating cannulæ. I have always employed the same instruments in girls and women as I use in boys and men, and have found them in every way satisfactory. In some cases, where girls and women strain very violently during the operation, the bladder soon becomes empty of fluid, and then it will be a wise precaution to withdraw the lithotrite and inject some more water. Much aid will be given to the operator if his assistant presses the urethra against the lithotrite and cannula while they are being employed. The general surgeon in Europe is afforded but few opportunities of learning how to use a lithotrite with precision and with safety to his patient. This is his misfortune and not his fault. Bearing in mind the superiority of litholapaxy to all other methods of extracting a stone from the female bladder he will, I think, be acting wisely if he entrusts the few cases of calculi in females which he may meet with to one skilled in the use of the lithotrite.

II.—COMPARATIVE SAFETY OF LITHOLAPAXY AND LATERAL LITHOTOMY IN BOYS.

Mr. H. Gilbert Barling of Birmingham, has published some valuable statistics* on the comparative safety of suprapubic lithotomy, lateral lithotomy and litholapaxy in young males in England. The figures he deals with are not very large; nevertheless, his statistics go to prove that lateral lithotomy and litholapaxy are safer operations in boys than suprapubic lithotomy is at present, and Mr. Barling is of opinion that if suprapubic lithotomy is to be adopted as a routine practice in the future in boys, it must be shown that it gives better results than it does now. Mr. Barling's opinion will, I think, be shared by all those who have had a large experience in the treatment of stone in the bladder, and, as a

* *Brit. Med. Jour.*, May 5th, 1894, and March 9th, 1895.

matter of fact, surgeons in India had long ago arrived at the same conclusions as Mr. Barling, for the operation of suprapubic lithotomy in boys has made no way whatever in India, and I may add that it is never likely to do so. At the beginning of last year my friend, Surgeon-Colonel O'Connell Raye, Inspector-General of Civil Hospitals in the Punjab, issued a circular to all civil medical officers serving in the circle of his administration, calling for the submission of returns showing the number of operations performed for stone in the bladder on boys up to age of fifteen years during the year 1895. Knowing the interest I have taken for many years in the question of the relative mortality of litholapaxy and lateral lithotomy in boys, he has very kindly placed at my disposal all the returns forwarded to his office in response to his circular, and the information contained therein is embodied in the table appended:—

TABLE II.—*Showing Number and Nature of operations for Stone in the Bladder performed on Boys up to Fifteen Years of Age, in the Punjab, during the Year 1895.*

Nature of operation.	Number of operations.	Average age of patients (in years).	Average weight of stone removed (in grains).	Average stay in hospital after operation (in days).	Percentage of mortality.
Litholapaxy ...	509	6.35	151.54	6.53	2.35
Lateral lithotomy ...	267	6.90	201.07	24.01	5.24
Suprapubic lithotomy ...	2	10.0	996.5	38.0	Nil.
Median lithotomy ..	2	6.0	155.0	18.0	Nil.

Seven hundred and eighty operations were performed on boys for stone in the bladder during the year under review, and the returns submitted were received from forty-eight civil hospitals and branch dispensaries scattered throughout the Punjab. The first thing which strikes one on glancing at the table, is that there were but two suprapubic lithotomies and two median lithotomies performed in the year. It will be as well to dispose of these four cases at once before proceeding to an analysis of the litholapaxies and lateral lithotomies. A boy, aged thirteen years, with a stone weighing 3 oz. and 108 grains, and which was adherent to the wall of the bladder, was submitted to operation of suprapubic lithotomy in the Mayo Hospital, Lahore, on June 5th, 1895. He remained in the hospital fifty days and was discharged cured. I think there can be little doubt that the operation selected was the correct one. A boy, aged seven years, was submitted to suprapubic lithotomy in the branch dispensary of Jellalabad in the Perozepore District, on September 11th, 1895. There were no small lithotrites in the Branch Dispensary, and the choice of operation lay between a suprapubic and a lateral lithotomy. The stone, uric acid, weighed 445 grains, and the boy remained under treatment twenty-six days and left the hospital cured. In this case I should say that

a lateral lithotomy would have answered equally well. The two median lithotomies may be dismissed in a few words. Both operations were performed at the Civil Hospital, Amritsur, and in both cases litholapaxy was contra-indicated for the following reasons. In one case, a lateral lithotomy had been performed elsewhere eighteen months previously; there were a number of stones in the prostatic urethra and one large one in the bladder. The calculi removed weighed 290 grains, and the boy aged five years, left the hospital cured nineteen days after operation. In the second case lateral lithotomy had been performed twice elsewhere; there were a fistula and an urethral stricture present. The stone, 20 grains in weight, was half in the bladder and half in the prostatic urethra; the boy's age was seven years; he was discharged cured seventeen days after operation.

And now to consider the litholapaxies and lateral lithotomies. The table speaks for itself. A glance at it shows that the litholapaxies were nearly twice as many as the lateral lithotomies. The average age of the patients was nearly the same in both operations; but the stay in hospital after lateral lithotomy was four times as long as that which followed litholapaxy. The average weight of stone removed by lateral lithotomy and litholapaxy was in the proportion of four to three respectively, and the percentage of deaths after litholapaxy was less than half of that which followed lateral lithotomy. A percentage mortality of 2.35 in 509 litholapaxies in boys is, I consider, a most creditable result, and it must not be forgotten that not a few of the operators were native assistant surgeons and hospital assistants. I may state, for the information of those who are unacquainted with the rules laid down in India regarding the submission of hospital returns, that the results of all surgical operations are arranged under four separate columns or headings—viz., "Cured," "Relieved," "Discharged otherwise," and "Died." My experience has been that when the result of any operation is tabulated in the "Discharged otherwise" column, it may be pretty safely concluded that the patient was *in articulo mortis* when removed from the hospital by his friends or relatives. Occasionally it happens that a patient discharged "otherwise" will recover, but the exception only proves the rule. And, therefore, in estimating the rate of mortality expressed in the table appended to be on the safe side, I have counted all cases "Discharged otherwise" as deaths. The table appended shows that year by year litholapaxy is ousting from its pride of place the time-honoured lateral lithotomy in boys, and, doubtless, when the branch dispensaries throughout the calculeous districts of India are fully equipped with lithotrites, evacuating cannulæ, and efficient aspirators, lateral lithotomy, even in boys, will seldom be performed. To fully equip numerous branch dispensaries throughout India

with these necessary instruments costs a large sum of money; but no doubt in time they will be supplied. Had all the branch dispensaries in the Punjab been amply supplied with small lithotrites, the number of litholapaxies in boys would have been considerably greater in 1895 than it was. The superiority of litholapaxy in boys over its two rivals, lateral and suprapubic lithotomy, is now fully established throughout the length and breadth of India, and to show how it has risen in the estimation of those best qualified to appraise its value. I shall quote the deliberate opinions of some of the most experienced surgeons in the Punjab when submitting the returns of stone operations for the year 1895. One surgeon, who has treated a very large number—several hundreds—of stone patients during his career, writes: "I consider this (litholapaxy) the only legitimate operation for removal of stone from the bladder when the conditions are suitable." This surgeon was obliged to perform a lateral lithotomy on a boy aged four and a half years, and he writes: "In this case the urethra was so narrow that the smallest lithotrite, No. 6 (Weiss), could not be passed and lithotomy became a necessity. *I consider lateral lithotomy infinitely superior to suprapubic lithotomy when the stone is of small or moderate size.*" Another very experienced surgeon writes: "If I may give an opinion I should say that an operator of experience with good instruments would remove stone by litholapaxy in 19 children out of 20." In this surgeon's district 34 boys were treated for stone in the bladder during the year 1895, and one and all were cured. Again, a third surgeon writes: "Out of 33 cases, litholapaxy was performed in 29, lateral lithotomy in 3, and lateral lithotomy with lithotripsy in one case, with very successful results—i.e., 1 death in 33 cases. The operation of litholapaxy in children is generally resorted to in cases where there is a likelihood of an easy removal of debris within a reasonable time, and the stone can be caught by the lithotrite that could be passed through the urethra into the bladder. The advantages in experienced hands are little danger and speedy recovery. Moreover, the patients and their friends do not like the cutting operation and often go away without relief if they come to know that lithotomy will be necessary." Were it necessary to do so, I might quote similar opinions held by several other experienced surgeons in the Punjab. The Indian peasantry are now fully alive to the advantages which litholapaxy possesses over lateral lithotomy, and they have begun to manifest a very decided aversion to any cutting operation for the relief of stone in the bladder. And hence it is that patients living in out-of-the-way villages undertake long journeys to the well-equipped hospitals in the large towns and cities of the Punjab when they learn that branch dispensaries are not supplied

with the instruments necessary for the crushing operation. The hospitals at Rawal Pindi, Multan, Amritsar, Jullunder, and Lahore have acquired a great reputation for the successful treatment of stone, and patients flock to them in great numbers from distant places. And the same holds true of other provinces of India.

(To be continued.)

"EPITHELIAL XEROSIS IN NATIVES OF INDIA".

By SURGN.-CAPT. H. HERBERT, F.R.C.S.,
Acting Ophthalmic Surgeon.

Read at the Bombay Medical and Physical Society on Feb. 5th, 1897.]

MR. PRESIDENT, LADIES AND GENTLEMEN,—The patients whom I wish to introduce to your notice are examples of a general degeneration and chronic inflammation of mucous membranes, very commonly met with in Bombay among the poorest classes. It is an affection which has received very little notice. And the only reason I can suggest for this neglect is that the condition is almost entirely a tropical one. We have been too content to leave our peculiar diseases, cholera and malaria for instance, to be worked up in Europe. Very often the conjunctiva, more especially in its exposed strip, on either side of the cornea, is the first membrane to show definite changes, and in the milder instances it may be the only one. This is not surprising, as the mere fact of exposure to the Indian sun is perhaps sufficient to account for it. So common is this conjunctival degeneration that in the four months June to September 1896 I was able to tabulate one hundred consecutive cases, and it is on them I base my remarks.

Epithelial xerosis of the conjunctiva has been described as a degeneration of the membrane found in debilitated persons exposed to strong glare, and in marasmic infants, and showing itself mainly in the formation of dry greasy patches on either side of the cornea. And the collection of cast-off epithelial cells and Meibomian secretion which usually covers these areas has been conveniently spoken of as 'forn.' It has been recognised that the conjunctiva is generally thickened, inelastic and wrinkled; there may be a good deal of inflammatory secretion; and in infants the cornea is liable to rapid suppurative destruction. I have a good deal to say on the eye affection which is so far as I know quite new, and in addition there are associated conditions which have to be dealt with. Whenever the conjunctival degeneration is well advanced, the patient is in a bad state from want of nourishment, chronic dysentery, &c., and we are certain to find other mucous membranes affected. There are often changes in the mucous lining of the month, a husky voice due to changes in the larynx, nasal catarrh and bronchitis, chronic diarrhoea or dysentery, flakes of cast-off epithelium as well as pus cells in the urine, and slight fever. Some of the worst examples of the eye affection are in marasmic infants.

Xerotic areas.—By far the commonest site of the dryness and foam is a small patch just outside the cornea. In my hundred cases this spot alone was affected four times as often as the conjunctiva on both sides of the cornea. The inner site was never alone xerotic. Occasionally much larger areas are affected. In two infants and in one adult the whole ocular conjunctiva was dry, greasy and wrinkled. In the infants at any rate, exposure of the conjunctiva can have nothing to do with the development of this condition, as I have noticed that those affected have their eyelids constantly closed; in them the condition is the result of constitutional disturbance alone. The one adult was remarkable for an extreme laxity of muscular fibre, an exaggeration of the lesser degree noticeable in many of these patients. When his lower lid was pulled away from his eyeball, it remained in the new position for a considerable time. The margin of the lower lid was constantly much lower than normal, and the act of blinking was infrequent and extremely imperfect, amounting simply to a slight twitching of the lids. So that in this case there was undoubtedly very much more exposure of the eyeball than usual. Another point noticeable about the xerotic patches is that they tend to be cast off by inflammation of the conjunctiva, primary or secondary, so that when both corneas suppurate, as they often do, there may be very little beyond a characteristic pigmentation of the conjunctiva to show the true origin and nature of the case.* The pigmentation is absent in white skinned races, so that in them such cases might be difficult of interpretation. A third detail worth notice is the quantity and character of the foam on the xerotic patches. Five of my hundred cases had dry spots only, with no fatty accumulations; they were not particularly mild cases, but were probably improving cases. In the mild cases the patches are often thinly covered with bright white glistening foam, sometimes frothy. In a few of the bad cases there are thick collections of dirty white soapy-looking material, though, on the other hand, some of the most extensive patches have only a greasy appearance, and no definite accumulations covering them. A fourth point of interest is the presence of foam on other sites. It is very frequent on a dull cornea, especially on its lower part or around its margin; also on a forming staphyloma. In one of the hundred cases the only foam was on the base of a phlyctenular ulcer, in another on a faint line of scar on the lower lid. Of more interest are the thick collections of soapy material on the lid borders sometimes seen in cases of conjunctivitis, primary or secondary, in Bombay. This material is quite

different from the thin frothy collections on canthi or lid margins seen at home as well as here. It is indistinguishable under the microscope from that taken from a xerotic patch, and contains the same bacillus in great numbers. This bacillus is interesting because of its close resemblance under the microscope to the diphtheria organism. It is worth mention that among my hundred patients one infant with double keratomalacia was attacked by croupous conjunctivitis. This is the only case of definite thick adherent conjunctival membrane which I have seen in Bombay (in eighteen months).

Pigment.—The next evidence of degeneration which claims attention is a dirty or muddy brown coloration, resulting from an excessive development of the pigment normally to be detected in an Indian conjunctiva only under the microscope. As might be expected, the depth of the tint attained, depends largely on the complexion of the individual, as well as

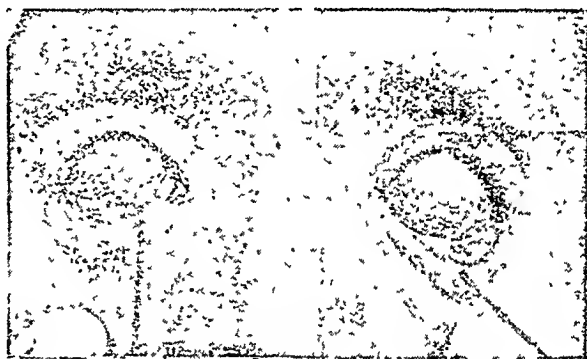


FIG. 2. The worst case of epithelial xerosis I have seen in an adult. The whole conjunctiva was more or less dry, and greasy, and, except on the tarsal portions of the lids, wrinkled like crocodile skin. The accumulation of cast-off fatty epithelium was scanty, and of a muddy colour like the conjunctiva itself. The dirty brown pigmentation of the membrane was everywhere; it was least marked on the upper lids and upper part of the eyeball, most marked in and about the lower fornix, where the colour was distinctly darker than the patient's skin. The cornea was wholly dry, dull and opaque, slightly pigmented, surface a little uneven (faceted). At A and B are healing ulcers overlying thickenings of tarsus; Meibomian secretion could be squeezed from a couple of points on the base of B.

on the degree of the xerosis and the length of time it has lasted.* Among the hundred patients there were three mild cases in whose eyes no pigment was visible; and in two others it was barely perceptible. In seven others the abnormal colouring was limited to the eyeball, and confined mainly or entirely to the foam patches. From these onwards there were many connecting links to the next type, which is perhaps the commonest. In this common type the pigmentation is fairly general on both the lids and eyeball. There is never much on the upper part of the eye. It is well developed on the exposed conjunctiva on either side of the cor-

* In sixteen of my hundred cases, there were no dry patches at all. Their absence was accounted for by keratomalacia or suppurating ulcers in nearly all. The xerotic degeneration was shown by conjunctival pigmentation, thickening and wrinkling and often by finely granular lids.

* Many of our patients have epithelial xerosis, perhaps with free intervals for many years. They are usually unaware of any thing wrong, and come to hospital for the treatment of complications or independent affections.

nea, and on the strip immediately below the cornea. Below this again there is a lighter strip; and then comes the lower fornix, often the most deeply coloured portion of the whole membrane. The pigment in the lower fornix often runs down in curves from the plica semilunaris or its neighbourhood, and may extend only part of the way around. On the lower lid the denser pigment may reach up to the lower edge of the tarsus. On the upper lid there is usually very little indeed except quite at its inner



FIG. 1. Eye of a mild but chronic case of epithelial xerosis. Boy of 11 years. The contrast in the intensity of different areas of ocular colouring is greater than usual. Upper part of globe white, dark band across centre, then lighter strip, finally lower fornix darkest. Dry patch with a trace of foam just outside cornea, not seen in this photograph angle. Lastly, we come to the cases, usually most severe, which present a more uniform and general browning. This is perhaps seen most often in infants and young children. In the infants the ocular pigmentation is generally moderate in degree; but the greater development in the lower *cul-de-sac* is especially marked. In these infantile cases the deposit of pigment is quite diffuse, giving to the eyes a general muddy tint. On the other hand, in very chronic cases in adults, lasting for years, the colouring often very deep, is apt to be patchy and punctate; but even in them one notices between the patches on the eyeball a fainter general colouring. I cannot explain the peculiar distribution of xerotic pigment. It may simply follow the distribution of the traces of pigment found microscopically in the normal conjunctiva, though influenced to a varying degree by a proportionately greater increase in the exposed portion of the membrane.

As the condition of the conjunctiva improves some of the pigment is absorbed, but a good deal remains, possibly permanently. And meeting these cases later, the question arises—How much pigment is required to be certain of former xerosis? This I cannot answer. There is no doubt whatever that the pigmentation I have described is characteristic of xerosis, and I have not seen the denser pigment except with xerotic patches actually present. In diagnosing former xerosis from conjunctival browning I should pay special attention to the greater quantity found in the lower *cul-de-sac*, and to the diffuseness of the ocular colouring. I should expect also to find the lids finely granular, and perhaps to find the patient suffering from chronic inanition. I have known this pigmentation together with the slight chronic pyrexia, emaciation and debility of these patients taken as evidence of malarial cachexia, in spite of the absence of enlarged spleen. This is quite unjustifiable. If we collect

cases of xerosis we find few of them with large spleens. In my hundred cases there were only six enlarged spleens.* If, on the other hand, we collect patients with large spleens, we find among them very few coloured conjunctivæ. Unfortunately, for this purpose big spleens are rare in Bombay; but in Kaira the other day I saw twelve cases, and Surgeon-Captain Sprague has observed another thirteen cases for me in Karwar (rejecting all slight and temporary enlargements). Out of these twenty-five patients only two had pigment in their conjunctivas; in one it was a congenital spot only, and in the other it was probably xerotic. This exemption is rather surprising. One might have expected the malarial poison, by debilitating the patient, to predispose more definitely to xerotic degeneration, and so to pigmentation of the membrane. Certainly, as far as I have seen, there is no other way in which malaria can colour the conjunctiva; I know of no malarial pigmentation of this membrane. I have only seen one post-mortem examination in a xerotic patient. He was an adult and died of chronic dysentery. The spleen was neither enlarged nor pigmented. The only abnormal pigment found, besides that on his eyes, was in his dysenteric large intestine.

Trachoma.—It is only to be expected that a damaged epithelial covering should fail to deal successfully with the microbes of the conjunctival sac; and the xerosis bacillus, at least, is present in great quantity. A very feeble chronic inflammation with muco-purulent discharge is set up, which after a time results in a cellular infiltration of the tissues and the formation of 'granulations.' The visible granulations are usually limited to the tarsal portion of the upper lid. They are so extremely small that it is difficult to say from their appearance whether they are papillary or follicular in nature. Their situation suggests that they are papillæ. But the sure development of fine interlacing lines or of thin plates of scar tissue soon shows the presence of true trachoma material. On microscopic examination we see both papillæ and cellular infiltration. Of my hundred tabulated cases nineteen were infants under three years of age; in them granular lids were uncommon, probably because in many instances there had not been time for the condition to develop. Among the eighty-one older patients trachoma was proved by the existence of scar tissue in thirty-two; in twenty-four others the presence of true granulations was considered fairly certain (in nineteen of them it was of the type described above, in five of more ordinary types); in fourteen there was some roughness of the upper lid; and in the remaining eleven the palpebral conjunctiva was of normal smoothness. The scar resulting from this very thin trachoma layer is not sufficient in quantity to lead to entropion.

* Slight enlargement may have passed unnoticed, as in many cases the spleen was merely felt for and not percussed out.

Corneal changes.—It is common in rather bad cases to find some opacity and dullness either of the whole or of part of the cornea. In some it is due to chronic inflammatory infiltration, in others to thickening and other changes in the epithelium. The latter is often limited to the lower portion of the cornea in sharply defined areas. A third affection of the cornea is the well-known ulceration of it, generally acute and suppurative, and often spreading over the whole cornea. This is not by any means limited to infants, as perhaps it is in Europe. My nineteen infants had among them only thirteen whole corneas, and most of these were somewhat dull and opaque; nineteen or exactly half were totally destroyed by keratomalacia. In the eighty-one older patients twenty-one per cent. of the corneas had ulcers or leucomata; and fourteen per cent. were completely destroyed.

Conjunctival ulcers.—Phlyctenes come more frequently on xerotic conjunctivas than on healthy ones. Sometimes they follow their usual course, but more often I think they enlarge into characteristic round or oval ulcers, 3m. or 4mm. across. Their margin is sharply cut, their base is smooth, slightly depressed, opaque, white in colour, or white with red points. They are slow to heal and may leave slightly depressed scars. I have seen them more often on both conjunctivas than on one; on each conjunctiva there may be one or more ulcers. They are more often situated on the palpebral* than on the ocular conjunctiva, usually near the lid border. Of my hundred patients only four had typical ulcers, and two more had scars left by them.

Associated conditions.—This description exhausts the conjunctival signs, and it remains now to give a brief account of the associated changes in other parts of the body. Most of the infants are in a state of marasmus, and the older patients grade in stages between a somewhat similar condition and apparently good health. Eleven of my nineteen infants were small and emaciated, with loose skin hanging in folds, old-looking wrinkled faces, and enlarged abdomens. Sixteen of them had more or less fever, fourteen had diarrhoea, sixteen a peculiar feeble husky cry, most of them had a cough, and one lobar pneumonia. Among the eighty-one older patients the general nutrition is not well recorded. Twenty-nine said they suffered from fever, but only about half of these appeared to have it at the time. Twenty-four complained of diarrhoea. The nose was not specially examined. In a few patients it was noticed that the mucous lining near the external nares was dry, brown and wrinkled; and nasal discharge was extremely frequent. In twenty-seven patients, mostly adults; the mucous lining of the cheeks, where

it is subject to friction against the teeth, showed pigment formation with papillary roughness, fissures and scar tissue. The slighter degrees of this change are perhaps little more than a modification and exaggeration of what is known as the smoker's patch; but the more extensive and advanced examples are quite characteristic and associated always with a bad type of conjunctival xerosis. Thirty-six of the eighty-one were thought to have their voice more or less affected. The voice is often rough, of a high pitch, and deficient in sharpness and volume. A few of these patients were examined with the laryngoscope, but nothing was found. I have lately examined the urine in fifteen well-marked examples of epithelial xerosis. In two of these urines epithelial cells were few in number, but in the other thirteen there were definite small flakes* of epithelium 1 or 2 mm. in diameter floating about. I looked for pigment in the cells but failed to find it. In eight of the fourteen urines there were pus cells, though there were no other definite signs of cystitis or urethritis, &c. In four out of twelve (three not tested) there was albumen. And there were generally numerous small masses of micro-organisms.

The cause of the affection.—Enquiries under this head point very strongly to insufficient and improper food as the cause, above all others, of the lowered general vitality which leads to epithelial xerosis. This is very noticeable in the infantile cases. In only twelve of our nineteen infants were enquiries made. Four of them were motherless, and hence bottle-fed; among the wretchedly poor and ignorant classes from which most of these patients are drawn, this statement may be taken as almost certain evidence of improper feeding. Two others, each over two years of age, were still taking the mother's-milk and very little else. In four other cases the mothers, who were suckling their babies, themselves had conjunctival xerosis; it may fairly be assumed that their milk could not be particularly nourishing. Another mother, also suckling her child, was very anæmic. Thus in eleven out of the twelve cases there was fairly distinct evidence of faulty feeding. The same is noticeable with older patients. A large proportion of the adults are beggars and wanderers, obviously in a half-starved condition, and often further reduced by diarrhoea or dysentery. The chief reason why conjunctival xerosis is mainly a tropical affection is not that the glare of the sun is strong; it is that in warm climates, the poor can and do support life in a wretched-feeble state of chronic inanition, such as would be impossible in colder places.

The nature of the affection.—In some of our patients the difficulty is not to find mucous membranes that shew signs of degeneration and chronic inflammation, but to find healthy

* Phlyctenes are ordinarily described in the text-books as occurring only on the eyeball. This is a mistake. I have collected a considerable number of cases of phlyctenes on the palpebral conjunctiva.

* These epithelial flakes soon disappear from the urine of patients admitted into hospital and given suitable foods.

mucous membranes. The changes in the stomach and intestine are probably those described by Soltau Fenwick in marasmic infants. The diarrhoea and dysentery are such as attack the famine stricken; they are the result of the feeble condition which they in turn intensify. They are far from being an essential factor in the production of the xerosis; for four of our nineteen infants who were free from diarrhoea were all among the eleven in very bad condition. The respiratory and urinary tracts are fairly generally involved. Concerning the genital mucous membranes I have not made enquiries.

Treatment.—Improving the general health and bandaging the eyes are the only measures from which I have seen distinct improvement. The bandage, however, is often inapplicable owing to corneal complications. Under this simple treatment the patient shewn in Fig. 2 has improved immensely in four months. There is now a barely detectable dry spot outside each corner; and the corneas, which were absolutely dry and quite opaque have regained their normal lustre and transparency over large portions of their areas.

HAS ADIPOCERE BEEN OBSERVED IN INDIA.

By GEORGE H. F. NUTTALL, M.D., PH.D.,

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THE writer is at present engaged together with Professor H. Thierfelder in experiments by which it is hoped more light will be thrown upon the process by which animal bodies undergo the adipocereous change. On looking through the rather extensive and scattered literature on "adipocere" we only find one publication which speaks of this change being observed in a warm country, i.e., "*Eight cases of Saponification*" by S. C. Mackenzie (*Indian Medical Gazette*, 1889, XXIV, p. 42). The author was Police Surgeon at Calcutta, and claimed that during 9 years he observed 8 cases of adipocere-formation in bodies of persons drowned in the Hooghly, or buried in damp soil. He states that his observations "show that this condition is more readily formed in the human body in the River Hooghly, as well as in the wet damp soil of Bengal during the rainy season than in Europe." Mackenzie refers to the well known medico-legal works of Taylor and Casper for observations made in Europe.

In Europe adipocere has been observed in bodies taken from the water after an immersion of 5 weeks to 1 year. Adipocere is rarely formed in less than 3 to 4 months, and the process is often not complete after a year's immersion. The change usually takes place more slowly in damp soil than in water. Casper cites an exceptional case where part of a foetus was adipocereous after 3 weeks' burial in a damp cellar. No such early

adipocere-formation has been observed in the case of bodies of adult individuals. The bodies of children are more frequently and rapidly converted into adipocere because they not only contain relatively very much more fat than adults, but also because their fat has a different composition, containing according to Langer less oleic acid and three times as much of solid fatty acids. The subcutaneous fat and bone marrow is first converted into adipocere, and then, in a manner which is not yet sufficiently clear, the muscles would appear to undergo at times a similar change. Normal internal organs are not converted into adipocere, but if they are in a state of fatty degeneration at the time of death, they may undergo this change. A very few cases are recorded where the heart and liver were found converted into adipocere. Masses of adipocere have been found in certain situations within the body cavities where fat normally occurs, i.e., about the upper part of the heart, the omentum, etc.

Mackenzie states that he exhumed two bodies 76 and 100 hours respectively after burial, both of which were "in an advanced state of saponification." Two other bodies were taken out of the Hooghly after an immersion of about 7 and 15 days respectively, both of which showed the same condition. Three bodies showed "saponification" after 2, 3, and 6½ days in the river. In his description of some of the cases he states that besides the external parts of the body the internal organs were saponified, saying that he found the heart, liver, lungs, stomach, intestines, spleen, kidneys, dura mater, and in two cases even the bladder (!?) thus altered. (In one case he speaks of the heart and liver being "healthy but saponified;" for my part I cannot understand how anybody can say than an organ so much altered as to appear "saponified" has also a "healthy" appearance.)

Mackenzie's description of the cases he observed is most superficial and totally wanting in scientific details. It remains an open question what it was that he observed and called "saponification." Hofmann (1890) states that muscular tissue which has macerated and putrified in water presents an appearance sufficiently similar to adipocere to deceive the unpractised eye. Nevertheless it is genetically, microscopically and chemically quite different. Possibly the changes observed by Mackenzie were simply the effects of putrefaction and maceration, which would naturally be much hastened by the high temperature of the water and damp soil in which the bodies were found. Mackenzie's observations would have carried weight if they had been accompanied by at least a single chemical analysis or a scientific description of what he saw.

It is quite possible that adipocere may be formed more rapidly at a high temperature, but, according to European authorities, a low temperature which retards decomposition and allows

the fats to remain solidified, is probably one of the essential conditions. We are at present occupied with experiments to determine the influence of temperature on the process.

The object I have in writing this, is to ask if any well authenticated cases of the finding of adipocere are on record in India, or if any of your readers have observed this change in human or animal bodies buried in damp soil or found in water. It would be of particular interest to know if anybody has examined such adipocere chemically. We shall be much indebted for any communications and would naturally mention those having scientific value in our forthcoming publication. To repeat *besides the doubtful observations above noted, we have not found any publication mentioning the occurrence of adipocere in warm countries.*

ENTERIC FEVER IN RANGOON AND ITS RATIONAL TREATMENT.

By SURGN.-CAPT. A. O. FITZGERALD, A.M.S.

(Continued from page 97)

To ensure efficient emptying of the cavities of the heart, and as a tonic, I commenced early in each case giving digitalis—

R	Tinct. digitalis	...	...	m.	x.
	Æther sulph.	...	...	m.	xx.
	Spts. ammon. aromat.	...	...	m.	xx.
	Aqua camph.	...	ad.	3	i.

every three hours night and day, continued until temperature was normal for a week or more, and then given three times a day till convalescence fully established.

To assist digestion, pepsine was given. R pepsini porci, B. P., or Morison's gr. iii every two hours night and day with food.

The majority of the cases did very well on this, so far as getting rid of the fever, &c., was concerned, but in all of them there seemed to be an intangible "something," which prevented their physical condition improving *pari passu* with the subsidence of the fever. I could only account for this by assuming imperfect circulation. Two cases of thrombosis of the lower extremity occurred, two cases of palpitation and irregular intermission of the heart, two had looseness of the bowels and slight fever on change of diet, two cases died: one Gr. G. on 6th day after admission from hyperpyrexia, very little ulceration in bowel, medium sized clots in the right ventricle and auricle, general venous engorgement, and effusion into lateral ventricles of brain. The other, Pte. L., on 27th day of disease, continued high temperature, head and nervous symptoms, diarrhœa, hæmorrhage and tympanitis, cyanosis coma, heart failure, moderate amount of ulceration in bowels, very large clot occluding tricuspid orifice, general venous engorgement and effusion in subarachnoid space at base of brain. I now decided, in any future

case when thrombosis was suspected, to give large doses of potas. bicarb.

A few days after the death of Pte. L. I saw in consultation a case which presented almost exactly similar symptoms, I diagnosed cardiac thrombosis, and under the treatment recommended, the temperature dropped to normal within 60 hours, the circulation was restored, and he became an entirely different looking man. He was given

R	Potas. bicarb.	...	...	gr.	xx.
	Æther sulph.	...	...	m.	xxx.
	Tinct. digitalis	...	...	m.	x.
	Spts. ammon. aromat.	...	...	m.	xxx.
	Aqua	...	...	ad.	3 i.

every 4 hours night and day for the first 24 hours without apparent effect, the potas. bicarb. was then increased to gr. 40, which had the desired effect in 36 hours, temperature normal, and no further rise. The amount was then gradually diminished, and convalescence though protracted was complete.

After this a case under my own care had a genuine relapse of very severe nature, thrombosis was suspected, similar treatment adopted with the result that all symptoms of obstruction to the circulation disappeared, and he is now making a good recovery, though he was not only "at death's door," but apparently head and shoulders through. He was given gr. 40 every six hours, and the action was not so rapid as in the previous case.

It will not be necessary to give details of all the cases in the series, suffice it to say that they all presented, in a greater or less degree, the same appearances, &c., and in the light of these events, when considering each phase of their cases, I am convinced that each and all of them suffered in some degree from cardiac thrombosis, venous engorgement and partial stasis.

It may be said that this is very slender evidence on which to base an assumption of this nature, but I have for years been struck with the number of cases of enteric in this country in which cardiac thrombosis has been found after death. Since I began to notice it particularly I cannot recall a case in which I have not found it. A run of cases of patent foramen ovale (4 out of 6) put me off for a time, as I thought the clot might possibly have been predisposed to by this condition. One seldom finds the fact recorded, though frequently the condition of the venous system described shows conclusively that clot must have existed. This, I think, is owing to the general belief in the insignificance of clots, especially when of small size, stained, or of soft consistence, in other cases they are liable to be entirely overlooked, and I believe I am correct in stating that the majority of medical men of the present day regard a clot of any size as merely a sequence of the moribund condition, formed

while the patient is dying, to be expected, and not worth mentioning.

Having made it my invariable practice, for many years past, to carefully examine all clots found *post-mortem*, and having observed carefully the appearances, physical signs and symptoms during life, I can say that the only difference I could detect between those which occur in a case terminating absolutely and unmistakably in cardiac thrombosis, and those which occur in ordinary cases which recover, or die of complications, was one of degree. There is nothing more natural than the deduction that cardiac thrombosis of a lesser degree is the cause of the milder symptoms.

Formation. — That the clot commences to form at a very early date, even while the patient is walking about, I have no doubt whatsoever. It probably begins in the right ventricle, but another may form simultaneously in the right auricle. In the ventricle I have never found it occupying the extreme apex, it appears to commence from $\frac{1}{2}$ to $\frac{3}{4}$ inch higher up, where it becomes firmly adherent to the posterior wall for about $\frac{1}{2}$ to $\frac{3}{4}$ inch, it then spreads upwards and inwards towards the tricuspid opening, the spreading end being free and rounded and larger than the attached end. The process may now cease, the clot not interfering with the action of the valves or circulation, except in so far as it diminishes the capacity of the ventricle, lessens the amount of work done, or rather increases the amount of work for the heart, with less result in the necessary oxidation and purification of the blood, diminishing the supply of pure blood conveyed to the left side, and overloading the venous system with impure blood. A corresponding clot will be found occupying the right auricular appendix and protruding slightly into the cavity, thus lessening the capacity for reception as well as despatch, and assisting in the causation of general venous congestion. This I may be allowed to call the "first degree," the clot will be soft, greyish, laminated, probably stained brownish or purple externally. Probably many mild cases recover without treatment in 8 to 10 days, and even when well developed the majority may end in resolution and recovery, though some permanent damage may remain, and a previously diseased heart may fail from the extra work thrown on it.

It may spread further than this, the direction depending on which way the free end is washed by the blood current, it may get washed under the muscoli papillaris and posterior cusp of tricuspid valve, and spread as high as the angle between the pulmonary orifice and tricuspid opening, but still leaving an opening for the blood stream to pass over it. This of course still further reduces the capacity of the ventricle, interferes probably with the working of the valve and leads to most serious consequences. The

clot in the auricle will be found to be diamond or star-shaped, attached by one corner to the auricular appendix, the others free, pointing to superior and inferior venæ cavæ and tricuspid opening, this might be termed the "second degree," clot firm, laminated, white or greyish, external soft layer purple or black if still spreading. The prospects of recovery with resolution are much lessened.

From here the tail of the clot may spread upwards and outwards to the orifice of the pulmonary artery, directly interfering with the blood current, and a thin tail may even extend through the pulmonary valves. That portion caught under the muscoli papillaris and posterior cusp spreading through the tricuspid opening unites with the process from the auricle and obstructs this orifice considerably. The clot in auricle now nearly fills that cavity. "3rd degree," clot white and laminated, firm and tough, pinkish surface, oldest portion very firmly adherent, resembling columnæ carneæ. So far as my experience goes, I think it possible for a patient suffering from this degree of clot to recover, though no doubt the complications which must be established by this time will be most serious.

The "4th degree" is reached either by extension from the 3rd or more rapidly from the 1st degree by the free end of clot becoming attached to the cordæ tendineæ, anterior and internal cusps of valve and anterior wall of ventricle, spreading towards or into the pulmonary orifice, preventing closure of tricuspid valve, leaving only one or two narrow slits between the muscoli papillaris, and a narrow slit running down behind clot, so that the blood, when the auricle is squeezed, is seen to well up from the apex of the ventricle below the attachment of the clot. The circulation is practically stopped. The clot in auricle has reached the openings of venæ cavæ and may extend into those vessels. A small clot will be found tangled in the cusps of the mitral valve, and usually a small thin one passing through the semilunar valves into the aorta. The left side, which may have acted very well until now, rapidly fails, and I think recovery is impossible.

Of course the formation of clot may cease in any one of these degrees, but the patient's recuperative powers be so defective that he is unable to recover. A *post-mortem* in the 6th or 7th week revealing only a clot of 1st or 2nd degree or perhaps none. The duration of each degree varies according to circumstances, but on an average in acute cases they probably occupy from 6 to 8 or 9 days each.

I do not think it necessary for me to point out in detail how the symptoms and phenomena of the disease can be "wheeled into line" when this central fact is accepted. From the flushed face, suffused conjunctivæ, dilated pupil, anxious expression, restlessness, sleeplessness with sometimes delirium (early head symptoms), &c., of the first stage, due to the excited action of a heart

trying to rid itself, of a burden and manfully striving to do its duty to the system. To the blanched face, expressionless countenance, drooping eyelids, blue lips, stupor muttering delirium, emaciation, diarrhoea, bed-sores, &c., of the final stage. The cause of frequent ulceration of the glands of intestine may be found to be due simply to the venous engorgement and stasis allowing the escape of leucocytes, bacteria, &c. However that may be, there is one thing certain that the quickest way to relieve intestinal symptoms is to clear the circulation. Hæmorrhage, for instance, is evidently either venous or capillary, the former due to overdistention of the vessels, the latter to an over-excited action of the heart driving the blood into capillaries from which there is no escape except by rupture. In either case how can one expect the blood to take any other course unless the fair way be opened for it? The hæmorrhage relieves the stasis for the time being, and there is a drop in the temperature, nature showing what ought to be done. The same applies to all other symptoms. Remove the cause by clearing the circulation, and the intestine and other organs and tissues will be able to look after themselves, all they ask for is a pure and clear blood supply, and the aim of the physician ought to be to discover the best means of removing any existing obstruction, and of destroying the bacilli which give rise to the condition without doing the patient any harm.

The symptoms of extension of the clot to any degree which in itself would be dangerous to life are so variable in different individuals, that I now think it better, for practical purposes to assume that every patient is suffering from a dangerous degree, until the fall in the temperature, returning colour, &c., indicate that the circulation is perfectly free. The heart of course should be examined daily, both right and left side, but beginners should be warned not to expect to find murmurs,—they are generally conspicuous by their absence. The first thing noticed, after the stage of excitement has subsided, will be weakness of both sounds, then gradually the first sound on right side becomes weaker and fainter until it is no longer heard, the sounds on left side often remaining good up to the very end, but perhaps a little too clear. When the 3rd degree is well established, a tricuspid murmur may be heard, and there may be reduplication of the pulmonary 2nd sound. In rare cases a systolic murmur may be heard at the apex earlier, but one should never wait for these to appear.

I have not yet been able to try the effect of the administration of the bicarbonate of potash mixture from the very beginning of a case, but judging from the results obtained from its late administration, I am in hopes that it may be the means of greatly reducing the duration of the disease, and so lessening the danger that

enteric may no longer be looked on in India as the bugbear it threatened to become. I am of opinion that the duration ought not to be longer than 9 or 10 days, and that ulceration of the intestine ought not to occur at all, when the case is seen early enough, it being of the utmost importance to give relief during the first week.

It is in the hope that others may now be induced to take up the investigation, that I publish these small results so soon.

Briefly, a few points to be decided are, will the potas. bicarb. prevent the formation of clot in the 1st week? Can it be relied upon to dissolve clot already formed? as it appeared to do in two cases.

Whether other salts of potash or other drugs possess a higher diffusion power and solvent action on clots? How long it takes for quinine to destroy the bacilli in the blood? In all my cases owing to uncertainty on this point, it was continued until the temperature was normal for three days, but this may not be necessary. Though symptoms of cinchonism in no way interfere with the continued administration of even gr. iv every two hours and pass off during the continued administration, as the patient recovers, and though I have never seen any bad effects remaining, still one does not wish to give any more than is necessary.

Also whether stasis occurs in the veins before, at the same time, or after the cardiac affection? It had been my intention to examine the condition of the veins of the intestine more minutely, but owing to the practical importance of the whole question, I am led to publish my results now, and leave these matters for elucidation afterwards.

REPORT ON PLAGUE.

BY DR. M. WILM.

Hongkong.

I.—CLINICAL SYMPTOMS AND PATHOLOGY.

(a) Most of the cases began without prodromal symptoms. Europeans and servants of Europeans generally show a sudden development of the disease in the middle of work, having felt quite well up to the time of attack. The fever begins suddenly, and prostration and the other well known symptoms of plague rapidly set in. In from 1 to 5 or 6 days after the fever begins, the glands begin to swell—at least as far as they are perceptible by palpation. Some cases show prodromal signs, but they are the minority.

(b) Regarding the general symptoms in my experience there has been a marked *facies* in the disease. Congestion sometimes increased even to sugillation round the eyes and on the forehead and cheek bones ("Black Death"—Schwarze Tod)—apathy to surrounding events—a certain painful tension, caused by oppression, glowing hot injected eyes, soon sinking back

into the sockets, the expression of extreme weakness, dry lips in the later stages of the disease covered with sordes, are the roughly described characteristics of the plague face.

(c) The tongue is swollen, furred, sometimes dried up; brownish or black as the disease progresses, occasionally with cracks or fissures and resembles the worst tongue of the third week of typhus or typhoid fever. In light attacks or in those with a very rapid course this dry stage does not develop so quickly.

(d) The other symptoms of the intestinal tract are want of appetite, great thirst, vomiting, constipation and in many cases later on diarrhoea with bloody evacuations. These symptoms may generally be explained by the fever, but in some cases they are apparently signs of alterations in the structure of the enteric mucous membrane. Indeed, in about 20% (30 in 150 cases), I found hæmorrhages underneath the epithelium of the mucous membrane of the stomach and intestine, in most cases as petechiae with circumscribed edges but occasionally diffuse. The lymphatic follicles and Peyer's patches were swollen in most cases, sometimes elevated and occasionally detached, leaving ulcers without slough and with floating margins. Simple injection of the mucous membrane could be seen in nearly all the cases, but there were some in which the alterations were so general in the intestine that the whole disease seemed to be a primary infection of the intestinal tract, with subsequent infection of the blood, especially if there were no externally apparent localisations of the swollen glands. This occurred in 33 cases out of 150. Apparent or marked localisations are to be understood as painful swellings of the glands exceeding, say, the size of a bean.

(e) The respiration was dyspnoeic if there was high temperature. In 20 cases out of 150 there was bronchitis and hypostatic inflammation. Hæmoptysis occurred in 15 cases (10%). Injection of the bronchial tubes and simple œdema occurred in nearly every case. The cases of bronchitis with bloody expectoration appeared to be more accidental localisations of the plague germ, as in most cases externally apparent buboes were observed. Pre-disposing catarrhs may have given a good soil for the growth of the bacillus. The bacillus never gave rise to destruction of the tissue here. Tubercular disease was only in one case evident. The mortality in bronchitis cases is the same as in non-bronchitis cases.

(f) Fever was present in every case but varied greatly in amount. There was no regular typical curve of the fever to be made out as is usual in almost all the other infectious diseases. It rises in some cases to 106° F. whilst in others it may only reach 102° F. The height of the temperature is no measure of the severity of the disease as patients with little fever of short duration generally die as well. The duration of

the fever generally lasts from a few hours to some weeks. In about 30% of the recovered cases, the fever of the infection lasted for about five or six days, and this may be regarded as typical. It is high at the beginning and sinks slowly down with frequent morning remissions. It may last as long as ten days. After this primary fever a secondary fever occurs in a majority of recovering cases. This is the "fever of absorption" and may lead to weeks of exhausting illness, and cases may die at this stage which were saved in the battle of infection. This fever is very irregular in duration and height varying according to the extent of destruction and re-absorption of the affected glands.

(g) The skin is in all cases dry and hot. In some cases cold perspiration occurs just before death. There was never anything like a critical or lytic sweat observed. Petechiae of the body were only seen in two cases. Herpes occurred in a few cases also. Four so-called carbuncles were seen. Wounds of the skin were rare and never irritated, no lymphangitis being present.

(h) Nervous symptoms are caused by the fever and the overloading of the blood with infectious materials. There is generally tremor, deafness, unconsciousness, delirium, in some cases of a violent character.

(i) The heart's action was always weakened, and in many cases dilatation of the right side occurred. Systolic murmurs and other signs of weakness being apparent.

(k) The urine always showed the presence of albumen—the average being from 1 to 5% of albumen. In the beginning retention of urine was frequent. The kidneys were congested, the capsules often showing hæmorrhages. Abscess of the kidney was never seen, neither was abscess of the liver. The gall-bladder was usually distended.

(l) The spleen was usually swollen and congested, the malpighian corpuscles being prominent on the surface of a section.

(m) Having considered the general symptoms of plague we now have to deal with the most prominent characteristic of plague, namely, the swollen glands. These may either be superficial and palpable, or intestinal and internal, or a combination of both. The affection of the glands might be called polyadenitis, hæmorrhagica infiltrative, a multiple inflammation of the glands with hæmorrhagic infiltration of the glandular tissue, with a tendency to infiltrative periadenitis, spreading from one gland to another centripetally and forming chains of infiltrated glands. Some of the glands break down. Infiltration may develop very quickly—even in a few hours—and may produce an extensive cellulitis in some cases. The time of development of palpable adenitis is irregular; it may be marked and evident in the first hours of the disease. Even large buboes may form in a few hours after

a time when a person has felt absolutely in the best of health. On the other hand we frequently see a patient dying of plague without one being able to feel a single affected gland and only a thorough *post-mortem* examination shows the slightly swollen glands, of lentil, pea or almond size, which show the plague bacillus by microscope and culture-tube. The plague gland in the polyadenitis form is clinically in many cases indistinguishable from the gland of syphilis, scrofula and lymphadenitis of ordinary septic origin. In many cases the plague gland shows a boggy, gummatous fluctuation, very tender on pressure and complicated with a hæmorrhagic suffusion of the skin over it. Out of 150 cases admitted alive into hospital, the following table shows the localisation of the glandular swelling at the onset of the disease. There were 80 males, 22 females, and 48 children.

Unilateral Inguino-Femoral	...	— =	43 %
Bilateral Inguino-Femoral	...	9 =	6 %
Unilateral Axillary	...	13 =	8.5 %
Bilateral	...	0 =	0 %
Unilateral Cervical	...	14 =	9 %
Bilateral	...	2 =	1.3 %
Submaxillary Unilateral	...	3 =	2 %
Bilateral	...	0 =	0 %
Cubital Unilateral	...	1 =	7.5 %
Multiple Bubo	...	4 =	2.7 %

Thirty-three cases (22 %) were received without a proper bubo. In most of these cases multiple adenitis was found, the general size of the glands being that of a lentil. In the later stages of the disease other buboes formed in different localities and complicated the case. Ninety per cent. of the cases showed swelling of the intestinal, bronchial and mediastinal glands in different stages.

(n) The mortality of patients admitted alive into hospital was 80%. The general mortality must be much greater, as most of the bad cases died before being discovered or in course of transference to hospital. Seventy-six per cent. died during the first 6 days, 4% died later on from the 7th to the 19th day. One may say that the former died from the severity of the disease itself, the latter from the after-effects, namely, exhaustion and suppuration. Death was generally caused by paralysis of the heart, in other cases from the brain mischief. The temperature at death is sometimes very high, sometimes subnormal. Convalescence is generally prolonged and often complicated by suppurative fever.

II.—MICROSCOPICAL AND BACTERIOLOGICAL EXAMINATION.

Microscopical and bacteriological examination has been very much handicapped by the absence of a large amount of apparatus which is quite indispensable for full investigation in this branch of science, and most of the apparatus had to be supplied privately. The work can therefore be regarded as incomplete till more apparatus arrives from Europe. I can only give a few facts

which already seem to be very promising for future work.

(a) The examination of the blood on reception of the patients into hospital was the first object for attention as the most easily procurable material for the diagnosis of doubtful cases. By the microscope alone I detected the bacillus in the blood in 32 cases out of 45 examined, *i. e.*, 71%. Cultivation of the blood on gelatine and agar-agar gave 29 positive results out of 35 cases, and 6 cultivations were negative. This gives 83% with positive results by cultivation. Of the first 32 patients 26 died, whilst of the latter 29 cases 25 died. These numbers show that one is able to find the bacillus in the great majority of severe cases in the early stage by careful microscopic examination, whilst still 10% more can be recognised by cultivation experiments. In one case streptococci were found besides.

(b) Examination of discharge from newly opened buboes and abscesses showed in all cases examined the presence of the plague bacillus. In about half the number of cases streptococci and staphylococci were found besides. The number of the bacilli generally correspond to the advancement of the swelling and destruction of the gland.

(c) The sputum of 12 plague patients suffering from bronchitis showed 11 positive results on cultivation, one cultivation was negative.

(d) In two cases of cultivation from the fur on the tongue the plague bacillus developed on gelatine.

(e) The culture examination of *fæces* gave positive results in all of the 15 cases examined where well marked enteric symptoms were present. In 8 of these cases no externally apparent bubo was present.

(f) After *post-mortem* examination the various internal organs were frequently examined, and in all cases the tissue of the spleen and in most cases the liver, the mucous membrane of the stomach and intestine, and the lungs gave positive results by culture and subsequent animal experiments.

All these examinations were made carefully and the positive results are beyond any doubt, and as they were made with imperfect apparatus, the further experiments will prove more than this. I hope to be able to state whether or not the bacillus is present in the soil of the Colony at different places, in the dirt of infected houses, in the water and latrines, clothes of infected persons, &c.

I will now report shortly about the inoculations performed on different animals. Two pigs, three monkeys, one cat, six rabbits, seventeen guinea-pigs and three mice were operated on. The inoculated substances were diseased tissue and pure cultures—two spleen inoculations, seven gland inoculations, two inoculations of the fur of the tongue, one blood culture, two pus cultures, eight *fæcal* cultures, four sputum cultures. Four guinea-pigs and two monkeys died from plague without being inoculated.

Of eighteen animal inoculations in the abdomen seventeen gave positive results, that is to say, the animals died of plague. Implantation of diseased tissue and pure cultures into the stomach by feeding or introducing them into the oesophagus by glass tube was made in nine cases with five positive results. These cases died showing clinical and anatomical symptoms of plague whilst under observation and on the *post-mortem* table. The other ones—two rabbits, one cat and one guinea-pig—were sick for a week, showed irregular fever but recovered. The one case of subcutaneous inoculation which did not die was that of a pig, which showed local inflammation round the site of inoculation but no glandular swelling, and is now twenty-two days after—still alive but apparently not quite well. The seventeen subcutaneously inoculated animals which died were four rabbits, ten guinea-pigs, and three mice. The five inoculated by the intestinal tract and killed were one monkey and four guinea-pigs. The death of the six cases which died without inoculation is to be attributed to some of them being purposely kept in cages in which plague animals had been kept and which had not been cleaned and washed in carbolic acid solution as usual, whilst the monkeys were kept under the cages of the other animals so that food, urine and fæces were freely allowed to bespatter their cages. Death occurred in the rabbits and guinea-pigs in from 2 to 6 days after inoculation. One monkey died in five days, the pig in twenty-two days, the mice in from twenty-four to forty-eight hours.

Remarkable points are that in all the cases of subcutaneous inoculation the tissue round the spot of abdominal incision was infiltrated and from there to the glands of the axilla and groin lymphangitic chords could be seen, and the glands of these two cases could be seen swollen as in human plague cases. The glands in the mesentery were swollen in nearly all cases. The cases dying after feeding with plague tissues or pure cultures showed diarrhoea in one pig and one monkey, the stomach and intestine showed sugillation, catarrh and swelling of the mesenteric glands as well as of the external glands.

These observations justify the opinion that the plague can enter the body—

- (1) by the skin;
- (2) by the intestinal tract.

There were no cases in this epidemic which I saw where signs of local inflammation round wounds were evident, and there are only two cases reported in Hongkong by Dr. Lowson and Dr. AOYAMA, in which plague with lymphangitis from cutaneous wounds the case of AOYAMA himself and NAKAHARA; but even here the opinions and reports differ. But as inoculation has undeniable success the possibility certainly exists. Infection by the stomach is possible, as 56% of the cases operated on by feeding experiments succeeded. This percentage means much more

than the wounding experiments, as it approximates closely to the natural conditions of life, in fact gives a method of infection without artificial means. We may thus argue that in many cases where the plague bacillus reaches the intestinal tract the disease may attack the body. This possibility is proved by the above experiments. Whether the healthy stomach is able to digest these germs when introduced can only be answered after more animal experiments have been carried out.

A Mirror of Hospital Practice.

A CASE OF HYPERÆMIA OF THE OVARY.

TREATED BY SYED MAHOMED ISA, C.H.A.

Surajgarba Dispensary, District Monghyr.

ON the 11th November 1896 I was called in to see a respectable Mahomedan woman aged about 30 years.

Previous history narrated by her relatives—She had a slight constipation, pelvic pain, and excess of periodical flow with dysmenorrhœa since the last few months. A few days ago 30 leeches of large size were applied by some one on the affected side of the pain, about an inch below the navel. In the course of two days, it gave no relief of any kind to the patient, rather it produced a bad effect and increased the burning pains all over the body, and kept the patient motionless on the bed, with insomnia and distress for three days continually since the time of her being leeches. The patient herself gave me information of one fact more,—that the os is somewhat dilated since the last menstruation and painful to touch.

Present condition.—The patient was anæmic and emaciated; had complaints from menorrhagia vesical and rectal tenesmus, and pain in the groin, extending down the thigh, and also tenderness with swelling in the ovarian region. The muscles of the affected side were rigidly contracted to protect the tender spot. Insomnia and restlessness in changing the sides on bed. Temperature somewhat abnormal, pulse full and irregular on account of constipation. Appetite dull, voice husky, faintness now and then present by the overbearing of the severe dragging pain of the lumbar region.

Treatment.—First of all saline laxative was administered to relieve the tenesmus. Then *impl. belladonna* 4" × 3' was applied externally on the affected side of the dragging pains, and *pot. iodide* gr. ii, *pot. bromide* gr. x, *liquid extract ergot* m. xv *ter die* internally. This mixture gave great relief to the patient during two or three days, but it was continued for more than a month, in the hope of the absorption of the ovary. Now she is quite well, has not any complaint of that kind, performs all her domestic affairs easily.

ANTI-DIPHTHERITIC TREATMENT CHART.

Patient's name } V. C., Male. Age 9 months. Date of commencement of Illness. Evening of 12th February 1897. Date of Injection. { 3-30 P.M., 16th February. Serum used, Behring's Antitoxin. { 10-15 P.M., 16th February. (9 A.M., 17th February. (Two drachms divided into Date of Serum bottle three injections at— 2nd January 1895.

1. What has been the effect of the Serum on the general phenomena? Beneficial. 2. What " " " local " Removal of membranous exudation.

3. Did any eruption follow the use of the Serum? No. 4. Was the larynx involved at the time of Injection? No. 5. Was tracheotomy performed? If so, state date. No. 6. Were any immunising injections practised on other members of the household? 7. If so, their number and result?

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(State amount given each time.)

After Injection.

(State amount given each time.)

Succeeding Uninterrupted recovery. days. Discharged on 26th February.

Nil.

4th day Better and brighter; sleeps Surface almost clear. and eats well.

3rd day Improvement continues. Membrane disappearing. Temperature fell to normal.

2nd day Condition fairly good; sound Membrane much less. Surface tends to bleed on sleep after injection. being touched.

1st day Peevish and restless; but not much distress. Went to sleep soon after both injections of serum. Ditto.

Before Injection. Marked anaemia. Breathing the rapid and, through the mouth, owing to the nares being blocked by exudation and secretion. Nose, back of soft palate and uvula, tonsils and pharynx.

General Condition of Patient. (Nose, Tonsils, Uvula Larynx, Pharynx, &c.) Albuminuria.

It was difficult to obtain the infant's urine; but some was got on one occasion, no albumen found on examination.

Bacteriological Examination Characteristic diphtheria bacilli.

Result of Treatment, Cured; no complications nor sequelae at time of discharge from hospital.

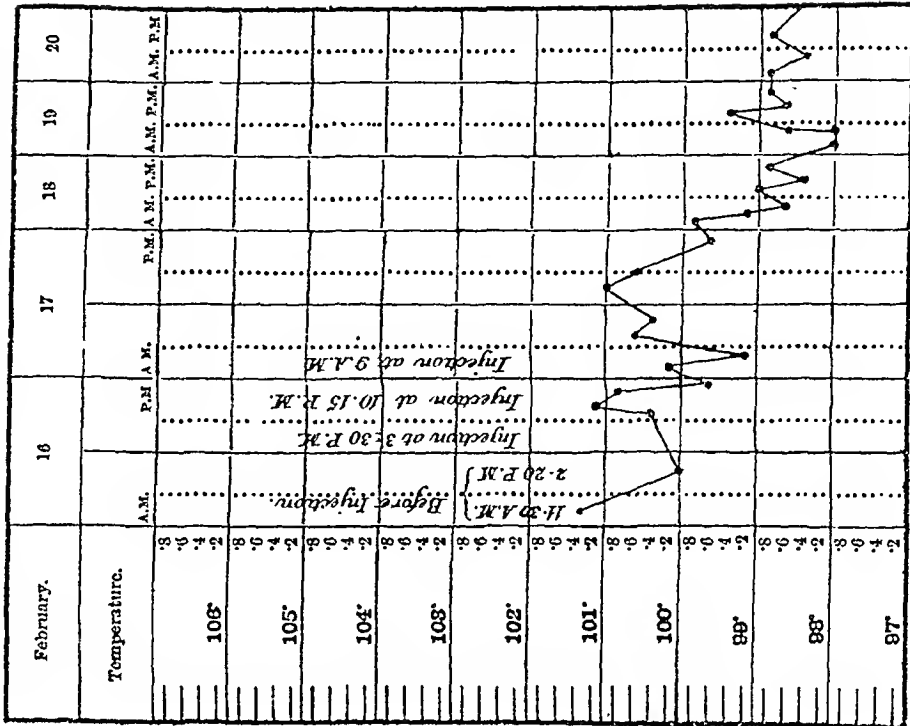
(Sd.) D. M. MOIR, M.A., M.B., Presidency General Hospital, Calcutta.

Indian Medical Gazette—April 1897.

REMARKS.

In the first instance an attempt was made to use a dried preparation of antiphthoritic serum; but, on failing to obtain a solution, this old fluid preparation was used, and it proved efficacious in spite of the length of time it had been kept. Two drachms were used altogether.

In this, as in other cases, it was noticed that the injection seemed to exert a sedative effect shortly after its use.



THE STANDARD.

A Scottish Life Office of 70 years' standing, and one of the wealthiest and most progressive of the Provident Institutions of the United Kingdom.

DOUGLAS STEWART,

Secretary,

Standard Buildings, Dalhousie Square,

CALCUTTA.

Indian Medical Gazette.

APRIL, 1897.

MALARIA AND IMMUNITY.

It is only possible to express oneself in general terms when discussing the liability of any given person to any infectious disease. On all sides we see instances in which the apparently feeble escape, while those who seem best fitted to combat the inroads of disease are struck down. The question of individual immunity from disease, together with that of the powers of individual resistance, forms a most interesting study, and the theories at present arrived at, though not strictly conclusive on all points, are satisfactory to a certain extent and help us to solve some of the difficulties regarding personal antagonism to attacks on the part of disease germs.

So far we are of opinion that we may safely say that in all cases those who depart most, in whatever way, from the ideal standard of bodily health will be most likely to suffer from *malarial* infection, and that, in those who appear to be in perfect health and yet suffer, the 'perfection' is only apparent; there is something or other below par. The liability to contract *malarial* diseases is very marked among strangers visiting a malarious district for the first time, and this liability is often increased when such persons, ignorant of their danger or careless in the joy of health, do not take proper precautions to minimise the possibility of infection. They may be travellers, explorers, surveyors or soldiers who are living somewhat below their ordinary habit as regards food and dwelling accommodation. They are incurring unusual fatigue both of mind and body, and it is at such times that they will fall victims to *malaria*. The watch-dogs of the body share in the general weariness, and the enemy enters into possession. Conditions, such as excess in eating or drinking, long abstinence

from food, dyspepsia, diarrhoea or "chills" from wet clothing or wet feet will predispose the individual to attacks of *malaria*; as will also undue exposure to a hot sun. Certain races are said to be more or less immune and able to dwell in *malarial* regions with impunity. The negro resists *malaria*, and the aborigines of certain countries seem also to dwell in the midst of alarms in comparative safety. Writing of Nepal, Captain Eden Vansittart* mentions certain tribes, dwelling in most *malarious* spots in the Nepal *terai*, which apparently suffer little inconvenience from their *malarial* surroundings. Darwin† accepted the undoubted differences, in constitution, in powers of acclimatisation and in liability to certain diseases, among the various races of mankind. He says regarding the negro:—"They likewise escape to a large extent the fatal intermittent fevers that prevail along at least 2,600 miles of the shores of Africa, and which annually cause one-fifth of the white settlers to die and another fifth to return home invalided. With the negro the immunity, as far as it is the result of acclimatisation, implies exposure during a prodigious length of time, * * * * * and the Revd. H. B. Tristram states that there are districts in Northern Africa which the native inhabitants are compelled annually to leave, though the negroes can remain with safety."

Individuals of a race thus immune may, however, lose their "protection" by long residence in non-malarious countries, and we frequently find negro sailors in the port of Calcutta suffering from *malarial fever*. As for the Hindus and Mahomedans of Bengal there is, as a rule, no immunity, and they suffer quite as much as Europeans settled, or working, in the country. Some may, and apparently do, acquire a certain tolerance of *malaria*; but this tolerance, so far as we can see, never extends to protection from mild attacks or continuous deterioration of constitution. It may be that in many persons the tolerance is only a deadening of the system to the irritation produced in its tissues by the *plasmodium malarie*. The poison of *malaria* is not contagious; but there is some reason to believe that the foetus *in utero* may be infected

* *Journal of the Asiatic Society of Bengal*, Part III, No. 1, 1894.

† *Descent of Man*, p. 167; pp. 193, 194, 2nd Edition, 1889. *Origin of Species*, p. xv. See also William, *History of the Expedition to the Niger*: London, 1813; quoted by Laveran, *Traité*, p. 15.

from the maternal blood should the parent suffer from *malarial fever* during pregnancy.

The inherited results of acclimatisation in *malarial* areas through long ages may, therefore, give some power of resistance to the individual, and, conversely, those who have no such inheritance will be the more liable to suffer from *malaria*. Even among the latter it is a matter of common knowledge that one person resists disease better than another, and we must seek some reason for this difference. Setting aside the question of prophylactic precautions, the value of which in diminishing our liability to disease is self-evident, have we anything within us which guards us against the attacks of bacteria, and protozoa such as the *anæba* of *malaria*? The liability to serious disease will no doubt vary with the amount of active poison imbibed, but with such quickly multiplying bodies as the *plasmodia* a very small amount must suffice when the individual is in poor health. The studies of Metchnikoff* have shewn that there are certain leucocytes, often called "phagocytes," whose duty seems to be that of seizing and destroying bacteria or other poisons entering the circulation through any of the *via naturales*.† These phagocytes no doubt attack the *plasmodium malarie* in the lungs, œsophagus and intestinal canal, as well as in the circulation, and when in full vigour, or when dealing with only a small number of enemies, seem able to defeat them. These cells will naturally share in any illness or weariness of the body, and at such times man offers an easy prey to parasitic foes. The action of these leucocytes is treated at length in a work, by Gaston Chatenay, to which we refer the reader. It must be noted here, though well known, that the *plasmodia* of *malaria* do not form any *anti-toxines* in the body, and their presence confers no promise of reduced liability in the future but rather the reverse. Herein they differ from most of the bacteria which seem to do us an unconscious kindness in producing substances and states of body which for a time protect us from further attacks of a like nature.

We cannot do better than close this article with a quotation from a lecture by Dr. G. Sims

Woodhead.* His remarks immediately concern protection from the attacks of tubercle bacilli, but apply with equal force to other diseases:—"It has now been very generally accepted that passing to and from the patches of lymphoid tissue in the walls of the alimentary canal, into and out of the canal itself, are numerous leucocytes, amœboid cells, or lymphoid corpuscles, as they are sometimes called. Further, it has been demonstrated that these small cells have the power of taking up foreign particles and of digesting them, or of so transforming them that unless they consist of particles of pigment they disappear; amongst these foreign bodies may be numbered bacteria of various kinds; so numerous, indeed, are bacteria in this position at certain periods of digestion that, by the use of proper staining methods, they can be readily demonstrated lying in the bodies of the leucocytes, whilst these small cells, in turn, with their contained micro-organisms, may be seen lying embedded in the large epithelioid cells of the lymph tissue. These observations are so readily made out and have been so repeatedly confirmed, and the appearances presented are so very similar to those described by Metchnikoff as occurring in connexion with the phagocytosis carried on by the leucocytes of the circulation, that very naturally the two processes have been compared and a phagocytic function has been assigned to the lymphocytes of the tonsils and to the cells of the adenoid tissue of the lower reaches of the intestinal canal."

HOSPITAL NURSING IN CALCUTTA.

FOR years past the provision of thoroughly trained nurses in hospital and private life has occupied the attention of medical men and others interested in the treatment of disease and the well-being of the sick. Much has been done in this direction for the Army in India through the strenuous efforts of Lady Roberts who successfully established the Indian Army Nursing Service, consisting of a staff of highly trained Lady Superintendents, Deputy Superintendents, and Nursing Sisters stationed at the most important military centres.

In the large Calcutta hospitals the nursing arrangements are made by the "Sisters of Clewer," a religious organization belonging to the Church of England. These ladies administer the

* Ref. *London Medical Record*, 15th October 1887.

† Outside the general value of a robust vitality, age has no influence on the liability to *malarial diseases*; they spare none. Sex, too, has no protective power, except in so far that women are generally less exposed by nature of their occupations.

* *Lancet*, ii, 1894, 957.

affairs relating to the hospital and home nursing organizations in this city, while at the same time they manage certain schools and other charitable institutions. The advantage to all concerned of having highly educated and refined ladies at the head of the nursing institutions is very great, and the "Sisters of Clewer" deserve the gratitude of the community for the services which they have rendered to our hospitals. We think, however, that the time has arrived for the Society of Clewer to consider whether it would not be in the best interest of the sick that the nursing arrangements, which only form a part of their organization, should not be more specialized to suit more modern necessities, and that the branches of their work which relate to educational and other objects should be completely separated from those concerned with the nursing of the sick. For, however advantageous the combination of duties might have been in the past, each department has now developed to such an extent both in magnitude and complexity that both cannot be easily or effectively managed by one administrator. To take nursing alone, the housing of the nurses, the arrangements connected with their food, rest, recreation and health, the supervision of their work, and their training demand the whole time and attention of a Lady Superintendent who, besides possessing administrative ability, requires to have had a special training in nursing and large hospital experience. These are duties which, to be performed in a satisfactory manner, require the undivided attention of a highly qualified lady. We have no doubt the Society of Clewer are in a position to make the arrangements such as we have referred to, and continue under improved conditions the good work they have so worthily begun. With an organization which shall include a trained superintendent and trained sisters, it will be possible to make such improvements in the nursing staff and arrangements as to bring them into line with modern requirements.

To secure a good nursing staff it is necessary to see that the health and comfort of the nurses are well provided for. In this country, especially where European women so easily break down, it is of the first importance that they should be comfortably housed in good quarters with plenty of air space, that they should have sufficient rest and time for recreation, and that their tour of duty should not be too prolonged. Further, in any reorganization, it should be borne in mind

that the higher classes of women should be preferred, as there can be little doubt they always make the best nurses. It has been maintained that the lower class of Eurasian women when employed as nurses are less liable to break down than Europeans and Eurasians of a better class. We think, however, that if the hygienic conditions under which the nursing staff carry on their work are thoroughly looked after, many of the objections which have been raised will be found to be unimportant.

A properly organized nursing institution should provide a well-arranged course of lectures in all that appertains to nursing, and for this purpose it is necessary that systematic lectures and practical instruction should be regularly given, to be followed by periodical examinations and the granting of certificates after completion of a definite course of study.

With these reforms carried out by the Clewer Society, there can be little doubt that the nursing arrangements in Calcutta will not only be put on a sound basis, but will at the same time remove a certain amount of dissatisfaction which has been expressed regarding the existing system.

PLAGUE IN BOMBAY.

It is a source of satisfaction to observe the steady decline in plague which is taking place in Bombay. From the fact of the total mortality from all causes decreasing very considerably we conclude that for the present the virulence of the disease has abated and that the worst is now over. It must, however, be remembered that the history of epidemics of plague show periods of decline, which later on may be followed by periods of recrudescence, the intervals between these being apparently filled up, and the continuity of the disease carried on by, cases of a mild and nondescript character designated by the names of *Pestis minor* or *Pestis ambulans*. We observe, in a Bombay contemporary, that already 200 cases of this nature have been brought to notice, and now that the epidemic is declining, it is of the utmost importance that these cases should be recognized and dealt with. For, besides keeping up the chain of continuity of the disease in Bombay, they may be the means of carrying the infection to other localities.

In view of the fact that plague is proved to recur in places it has already attacked, it is necessary for the Sanitary authorities not to

relax their efforts either in the measures which they have adopted for stamping out of the disease or in those intended to prevent the infection from spreading.

Medical News.

THE STATE OF THE ARMY MEDICAL SERVICE.

UNDER the heading of "Why not a Royal Medical Corps"? the *United Service Gazette* has the following article:—At the very time we were penning our short article last week, on the Army Medical Service, our views as regards the then probable results of the last Examination for the Army Medical Staff were most fully warranted by the absolute facts. This became manifest upon the publication, within a few hours, in fact in time to appear in our same issue, of the list of successful candidates.

Only one half (14) of the total number (28) of candidates who presented themselves for examination succeeded in obtaining the necessary qualifying marks, fixed, we have reason to believe, at a not too high standard of professional attainment. We have then now to realise that, for 35 officially announced vacancies in the Army Medical Staff, our War Office has only obtained 14 medical officers. These figures are almost worse than those relating to former examinations.

What, then, is the next step the Secretary of State for War—the person responsible for the deadlock—proposes to take? Let us offer a hint to him; it is this,—to cease publishing to the world the fiasco of each succeeding Examination for the Army Medical Staff, and to refrain from advertising any further for candidates, until he sees his way to concede to Army Surgeons a proper recognition of their rank (and as a result social status) by forming a "Royal Medical Corps" of the Army Medical Staff and Medical Staff Corps, as suggested by Lord Morley's Committee's Report, after the Egyptian War. With this reform, the desirability of which we have before pressed upon the authorities, proper designations for the departmental officers would have to be conceded. Why not, we would suggest, Colonel or Major Blank, "Royal Medical Corps or Staff"—the rank and title would here be definite and recognised, and the Corps known, "urbi et orbi," as Medical. An occasional Army Surgeon might possibly be found who would drop his Corps designation ont. Such an individual would lack proper "esprit," and his brother officers would properly soon let him know what they thought on the subject.

It is only our intense insularity and prejudice which stand in the way of needful and "up-to-date" reform of the Army Medical Service.

One of the most brilliant Medical Services, composed of the ablest and best Surgeons, is that of the Army of the United States. The Surgeons there have the Combatant title, followed by Surgeon, e.g., Colonel Dash, Surgeon, United States Army; and no one can for a moment say that this interferes with the thorough efficiency of the American Army Surgeons. Their contributions to Military Surgery are historical. No better record exists than the volumes produced by the United States Army Medical Service on the American War of 1864-65. The concessions recently made by the War Office were, according to Mr. Brodriek's statement in the House of Commons, presented on behalf of the Army Medical Staff by the Parliamentary Bills Committee of the British Medical Association to the Secretary of State for War some years ago; but they do not deal with the burning point of Social Status.

PROFESSOR KOCH AND THE RINDERPEST IN AFRICA.

FURTHER EXPERIMENTS ON THE PRODUCTION OF IMMUNITY.

PROFESSOR KOCH has presented an additional report to the Secretary of the Agricultural Department of Cape Colony. This report is as follows:

IMMUNITY PRODUCED BY BLOOD SERUM.

I have the honour to report herewith to you on several very important facts resulting from my investigations at the rinderpest experimental station. In my last report I was already in a position to inform you that the blood serum of cattle which have recovered from rinderpest had a certain immunising effect upon healthy stock when inoculated with it. Its protective properties, however, are not very great, for 100 c.cm. of such serum are required to protect an animal against an inoculation with a small dose of rinderpest blood. This immunity is in its nature merely a "passive" one, and will only last during a short period. For protective inoculation on a large scale such serum is not applicable, but I succeeded in immunising within a fortnight several animals by means of a mixture of serum and virulent rinderpest blood to such a degree that they were enabled to withstand an injection of 20 c.cm. of rinderpest blood, a ten-thousandth part of which is a fatal dose. From this fact I judge that the immunity of these animals is of a much higher degree, and I believe it is an active immunity equal to that of a beast which has contracted rinderpest and has then recovered. It is particularly important to know that only 20 c.cm. of such serum are required to immunise one animal, and 1 litre—nearly one and three-quarters of an im-

perial pint—suffices for fifty head of cattle. My further investigations concerning this *modus operandi* will aim at finding: whether this immunity is obtainable in a still shorter period, whether a still smaller dose of serum will suffice, and if it may be obtained with but one injection.

IMMUNITY PRODUCED BY BILE.

A second and equally important fact is that one is able to render immune healthy cattle with the bile of such as have succumbed to rinderpest. In this case a single hypodermic injection of 10 c.cm. is sufficient. This immunity sets in on the tenth day at the latest, and is to such an extent that even four weeks afterwards 40 c.cm. of rinderpest blood could be injected without any injurious effect. I therefore conclude that the immunity produced in such a manner is of an "active" nature. The local result of an injection is merely a hard somewhat painful swelling of the size of a man's fist, and which gradually disappears in the course of a few weeks, provided, however, that the bile is not in a state of decomposition, as is not uncommon when an animal suffers from rinderpest. Under such circumstances an abscess may form, which, however, does not seem to be detrimental to the process of immunisation. Both the above-mentioned facts convince me that rinderpest can be eradicated with but little difficulty, and within a comparatively short time by putting these methods into practice. The method of immunising cattle with serum may be employed in order to separate from infected areas those tracts of country which are still free from the scourge, by means of forming a broad belt between them in which all the cattle are inoculated with the vaccine. The protective properties of the bile will be of inestimable service.

PRACTICAL APPLICATION OF THE METHOD.

In infected parts nearly every case of rinderpest supplies a greater or lesser quantity of vaccine for those animals which are still healthy. I cannot but urge upon you the importance of bringing this method immediately to the notice of those cattle owners whose animals are suffering from or threatened by the disease, for I am sure thousands of cattle may daily be saved by its application. The *modus operandi* is very simple in both these methods, but it will nevertheless be desirable to teach as early as possible veterinary surgeons and other persons fitted for such work. I am willing to give a course of instruction at the experimental station in Kimberley. It may further be advisable at once to take into serious consideration the establishment, in other parts of the country, of branch stations of the central laboratory in Kimberley to furnish them with the necessary equipment, and to appoint suitable persons to take charge of them. With reference to your telegram, dated February

6th, I beg to add I do not now consider it essential to experiment on camels, as our experiments performed on cattle have been so favourable.—*British Medical Journal*.

LONDON LETTER.

THE attitude of the people of India in the face of the drastic measures which the Government has been compelled to resort to in order to stay the spread of plague is wonderful. Never in the whole history of British rule in the East has the subject been subjected to such uncompromising interference with his liberty—with his personal movements, his domestic privacy, his prejudices and cherished traditional customs. Evacuation of dwellings, forcible cleansing or destruction of these, removal of the sick to isolation hospitals, inspection and detention of travellers—these and similar proceedings must to a sensitive, exclusive and conservative race be most unpalatable and irritating, and yet they seem to be submitted to without a murmur. Even the strongest religious feelings are lacerated, as by the prohibition of the Mecca pilgrimage, and the Mahomedans who are not prone to suppress their sectarian fervour, manifest no resentment. Further, the municipal institutions which were established for the purpose of educating communities in governing their own affairs, and which were intended to entrust a measure of political responsibility and power to the masses, have been somewhat roughly handled, and as in Calcutta and Bombay the Government has interfered to supersede their slow, halting and nig-gardly efforts by instituting agencies empowered to act more vigorously, thoroughly and liberally, and no loud voice of protest is raised to condemn the rude tyranny of the foreigner. The fact of the matter is that the crisis is a serious one, and Indian populations feel it to be so; and while the strong steps which Government has been compelled to take in order to save life and avert disaster, vital and commercial, are acquiesced in by the victims of the plague and its attendant panic, the propriety and necessity of them is fully and admiringly acknowledged by the rest of the civilized world. At the same time that a British Government is compelled to do things in India which are calculated to irritate and annoy Indians, a generous British public has contributed nearly half a million of money for the relief of the Indian famine which now appears to be in its acutest stage. I was present last night and took part in a discussion on Sanitation in India at the Parke's Museum under the auspices of the Sanitary Institute. It was opened by an interesting paper by Mr. Baldwin Latham, which, as might be expected, dwelt prominently on the importance of executing sanitary works for supply of water and sewage removal in cities and towns. The peculiar diffi-

culties which existed in India with its high temperature and heavy rainfalls and dead levels, and the means necessary to overcome them were clearly and shrewdly dwelt on. The subsequent speakers diverged into a number of cognate matters, and the subjects of sanitary education, village sanitation, and utilization of excreta as manure were prominent among these. One speaker contended that the Native Indian, though much has been said and written to the contrary, is not uncleanly in his instincts and ways, according to his light, that in matters of personal and domestic cleanliness, he was scrupulously, elaborately, laboriously, cleanly, in fact that the whole centre system was a protest and precaution against contamination. The instinct of cleanliness being there, it only required education to ensure its proper direction and application. This view seemed to commend itself to the meeting. As regards sanitary education, it was suggested that this ought to be an integral and essential element in the teaching and training of the young in schools. This is well as far as intellectual knowledge goes, but social education as regards the home, the village, the town, the city is also needful, and this cannot be imparted practically and usefully in schools. It is here that the active enlightened Government comes into supplement and apply book-knowledge. Sanitary administration and sanitary work are the means to the end of social sanitary education. It is in this matter of concerted, associated action to sanitary objects that, as I recently pointed out, the social codes and social customs of the natives of India are deficient, and it is to the purpose of supplying this deficiency and creating salutary habits of common life, that the efforts of Indian administrations have been and must continue to be devoted.

There was a strong feeling in the meeting that the village-life of India must not be too rudely disturbed, and that customs which are sanitarily harmless or even beneficial, such as the early morning resort to the field or bush, must not be interfered with even though they differ from those of western nations. The restoration to the soil for the useful purposes of material derived from the soil is a rational process, and, when carried out with proper precaution, a safe and profitable proceeding. But there are matters in rural India which do demand intervention, and the condition of drinking and cooking water is assuredly the chief of these. On the question, Mr. Baldwin Latham was very strong, and he detailed with satisfaction many illustrations of the benefit to health which had followed arrangements for the supply of such water to Indian communities. The subject of several diseases in the European Army of India is being taken up with vigour. There are to be debates in both Houses of Parliament at an early date on the question. Lord Ouslow's

Committee has, I believe, completed its inquiries and is busy preparing its report. The Army Sanitary Commission has delivered a strong pronouncement in favour of active preventive effort; an influential meeting was held recently at the United Service Institution where the subject was warmly discussed for three hours, and as a result a Committee has been organised of persons interested in the question to promote the adoption of measures calculated to reduce the amount of suffering and disability caused by these maladies in the army. What the outcome of all this agitation will be it is difficult to predict. These diseases were somewhat arbitrarily removed from the list of contagious affections for whose prevention regulations could be framed in India under the laws, and it is probable that they may be restored to the list, and means of detection and segregation, combined with medical and moral treatment, resorted to. The extent to which constitutional infirmity is caused in civil life among the rising generation by the marriage of syphilitic soldiers after their discharge from the army is clearly occasioning alarm.

In Russia there was a commission not long ago which sat for the purpose of investigating the extent to which syphilitic disease was sapping and degrading the national health. Very stringent and searching ordinances were recommended, with a view to the detection of disease in both men and women in civil, as well as in military life, and the detention in hospital of persons dangerous to the common welfare until they ceased to be so. It is on this principle that other communicable maladies are recognised and treated, and although the circumstances are in the case in question peculiar and difficult, the policy of blind inaction appears to be getting discredited in this country.

12th March 1897.

Transactions of Medical Society.

CALCUTTA MEDICAL SOCIETY.

THE usual monthly meeting of the Society took place on the 13th January 1897, Dr. BOLYE CHANDRA SEN, the President, being in the chair.

Surgeon-Major R. HAVELOCK CHARLES read a paper on "A Method of Operating in Elephantiasis Seroti, with a series of sixty consecutive successful cases."

The next meeting of the Society was held on Wednesday, the 10th March 1897, Dr. BOLYE CHANDRA SEN, the President, read the following paper:—

ON THE CURABILITY OF ASCITES DEPENDING ON CIRRHOSIS OF THE LIVER.

LADIES AND GENTLEMEN,—I have several times appeared before you on the subject of liver diseases which are more or less hopeless and fatal so far as our present knowledge goes; but this time I beg to bring before you the theme of the curability of ascites, a subject fraught with interest

to all of us as medical practitioners; and you all, I doubt not, have met with cases of the description in the course of your practice. Ascites depending on malarial cachexia and chronic peritonitis (the disease or rather the symptom) is amenable to successful treatment in a number of cases and the patients enjoy tolerably good health after their cure. But very few cases of ascites arising from cirrhosis of the liver I have seen recover to all intents and purposes: so I will take the liberty and with your permission relate to you a case that came under my own observation in the 1st medical ward of the Campbell Hospital while I was attached to it.

Basanto, *et. 40* years, was admitted into the 1st medical ward of the Campbell Hospital on the 20th October 1886.

Previous History.—He was in the enjoyment of good health up to the age of 22 years when he became addicted to drinking spirituous liquors and smoking *ganja* and *charros* (different preparations of Indian hemp) up to the date of his admission.

Symptoms on admission.—On admission he was found thus:—Weak and emaciated, abdomen enlarged, abdominal veins prominent, liver and spleen cannot be felt owing to the accumulation of fluid in the peritoneal cavity, both legs and feet are oedematous, pulse feeble, countenance rather sallow, passes urine frequently and in small quantities, but without any pain or difficulty, appetite poor, bowels irregular, mind bordering on frenzy, easily runs into a passion when his wishes are in any way crossed, talks incoherently, distinct fluctuations in the abdomen on palpation.

The usual stereotyped medicines such as diuretics and saline purgatives were administered to lessen the abdominal fluid and with the usual result—failure. At last on the 11th November 1886 the abdomen was tapped at the usual place, and 21 pints of clear transparent light straw-coloured fluid was drawn out and the wound dressed with sticking plaster and lint and the whole abdomen properly bandaged; but the man as stated above was broken down in health and irritable in temper and scarcely attended to our injunctions as to keeping the bandages on, &c., &c.; as to food he was very fastidious in his taste, would not eat what we thought good for him but would kick away the *thali* (brass plate on which food is served) and slap the coolies.

He went on getting diuretics and saline purgatives; tonics and stimulants according to his needs, and a large dose of bromide of potassium at bed-time to put him to sleep and nourishing and easily digestible food, but he did not much improve in health nor did the remedies in any way retard the reaccumulation of fluid in the peritoneal cavity, so he had to be tapped again on the 28th November 1886, *i.e.*, seventeen days after the first operation, a very short interval no doubt. After the second tapping he was treated with diuretics and Tr. steel and felt fairly well, though the abdomen went on gradually enlarging from accumulation of fluid, and he had to be operated on again on the 7th January 1887 when a large quantity of serous fluid was removed and the patient was dressed in the usual way; but the abdomen this time did not rapidly swell nor to the extent as on previous occasions, though the fluctuation on palpation was very distinct.

After a time, about the end of March next, he had a mild attack of dysentery which readily yielded to treatment, and since then he commenced to improve in health and the abdominal accumulation gradually began to disappear, though he suffered several times from slight attacks of dysentery.

His condition after this may be summed up as follows:—That he was a pretty healthy looking man, well nourished, no enlargement of the abdomen, no prominence of the abdominal veins, liver could not be felt by palpation in the abdominal cavity either in the recumbent or standing position, but the liver dulness extended up to near the right mamma, spleen slightly enlarged.

At about the same time another case in the 2nd medical ward under the care of Dr M. N. Goopta was cured in a way which will appear surprising to you all. The man was admitted for ascites and the usual remedies were administered and with the usual result, but fortunately for him a very minute opening appeared in the serotum from which there was a constant oozing of serous fluid, and he also in course of time made a perfect recovery. These two patients were kept for some time under observation to see whether there was a relapse as is not infrequently the case in this disease. Basanto was sent to the Dullanda Asylum on February 1st, 1889, for mania, *i.e.*, after one year and 10 months' observation.

Gentlemen,—My object in bringing these two cases to your notice is that they were the only cases of their kind that I have seen cured in my experience. I have seen, no doubt, arrest of progress and amelioration of symptoms, but not cures in the true sense of the term. Others I doubt not may have seen cases of this nature. I do not claim any credit for the recovery of the patient under my care, nor does Dr. M. N. Goopta for

the recovery of his; for we know full well that these two cures were in no way owing to our skill in treating them, but to causes or circumstances of which we are not cognizant except the apparent cause in the second case, but that could not have cured but might have alleviated, so long fluid escaped from the fistulous opening in the serotum.

These two cases, Gentlemen, prove to demonstration that under certain circumstances ascites depending on cirrhosis of the liver may be cured, and this should lead us to inquire what factors are generally at work to effect the cure and what to thwart us in our endeavours.

I candidly confess my inability to dive deep into the mysteries of nature and trace the real cause of cure, though I have thought long on the subject and consulted a good many authorities, *viz.*, Fagge, Chevers, Strumpell, Ziemssen, Nemeyer, Frerichs, Flint and F. J. Roberts.

I will give their views in this disease which I hope will not be unacceptable to you.

Fagge believes in the curability of ascites depending on chronic peritonitis or peri-hepatitis, and in children and young persons even when it is the result of tuberculous peritonitis with or without paracentesis.

Chevers believes in its curability when arising from malarious cachexia without paracentesis, but the operation makes it unsuccessful.

Strumpell is of opinion that repeated tapings improve the nutrition but does not cure the disease.

Ziemssen, Nemeyer, Frerichs and Flint entertain very unfavourable opinions, and consider the disease absolutely hopeless and fatal.

Frederick J. Roberts is the only authority that believes in the curability of ascites depending upon cirrhosis of the liver, though he avoids discussing "as to how the beneficial effects are produced." In his work on "The Theory and Practice of Medicine," ninth edition, page 391, he says: "There are two measures which demand special notice in relation to peritoneal dropsy, namely—paracentesis abdominis and the employment of pressure. It has been the custom to look upon paracentesis as an operation which should only be performed as a last resource when the fluid has become so abundant as to cause urgent symptoms."

When ascites is a part of general dropsy from cardiac or renal disease the amount of fluid is not often so great as to need its removal by operation, nor could this serve any beneficial purpose as a rule, except in affording temporary relief, although occasionally ascites from cardiac disease has been cured by this method in my experience.

Temporary improvement can only be expected also in certain cases in which it is merely a local dropsy as when ascites is associated with cancer of the liver; but there is one class of cases in which paracentesis may not uncommonly be performed as a curative measure so far as the ascites is concerned, namely, when it is dependent upon cirrhosis of the liver.

In such cases I have for many years had recourse to paracentesis as a systematic method of treatment. In some instances one such operation has sufficed for a cure; usually it has to be repeated, and I maintain that the fluid may with advantage be taken away again and again should it reaccumulate, due care being of course exercised in the performance of the operation and in the subsequent management of the case. My own results have been highly satisfactory and other observers have also recorded favourable results from this operation; therefore without entering into any discussion here as to how the beneficial effects are produced, it appears to me justifiable to insist upon the employment of paracentesis abdominis as a means of cure in connection with ascites from uncomplicated cirrhosis of the liver, should the fluid be at all abundant and show no signs of being got rid of by other methods of treatment. I am fully aware that recovery does sometimes follow merely general tonic and other modes of treatment, but this is such a rare event that sole reliance cannot be placed on these measures, though they may aid materially the treatment by operation, and some of them may be adopted as adjuncts after paracentesis. With regard to the method of operation a suitable trocar and cannula, the aspirator or Southey's tubes, may be employed. In cases when ascites rapidly returns after paracentesis, permanent drainage has been recommended and practised with success. Pressure is also often of much service, the abdomen being tightly bound by a broad flannel roller as soon as all danger of undue irritation has ceased. I may state that seldom has any injurious consequence followed paracentesis in my experience; and in some almost hopeless cases permanent recovery has been brought about. The employment of poultices of digitalis leaves along with pressure has appeared to me to do good in some instances."

I have nothing more to say than that I add my humble testimony to the possibility of radical cure of ascites depending on cirrhosis of the liver to those others which have been cited above.

THE BOMBAY MEDICAL AND PHYSICAL SOCIETY.

Title.

1. This Society shall be called "The Bombay Medical and Physical Society."

Objects.

2. The encouragement of Medical Science and its collateral branches by discussion at periodical meetings, and by the publication of original communications.

Constitution.

3. The Society is composed of Ordinary, Corresponding and Honorary Members.

Ordinary Members.

4. Medical Officers of Her Majesty's Naval and Military Commissioned Services; the Chief Medical Officers of the G. I. P. Railway and of the B. B. and C. I. Railway, and the Superintending Surgeon of the P. and O. S. N. Company, are elected Ordinary Members of the Society on application by letter addressed to the Secretary.

5. Qualified Medical Practitioners, not eligible under Rule IV, are elected by ballot of the Committee of Management.

6. Medical Officers coming under the provisions of Rule IV on first arrival in the Bombay Presidency are considered Ordinary Members as in Rule VII.

7. Ordinary Members pay an annual subscription of Rs. 15, payable in advance in the month of January.

8. Ordinary Members absent from India for more than six months in any year are exempted from payment for that year.

9. Ordinary Members on retiring from service in India are eligible as Corresponding Members by invitation of the Committee of Management.

Honorary Members.

10. Scientific men not residing in India are eligible as Honorary Members on invitation by the Committee of Management.

Election of Office-Bearers.

11. The Surgeon-General with the Government of Bombay for the time being shall be President of the Society and *ex officio* a member of the Committee of Management.

12. The Committee of Management of the Society shall consist of eight members elected annually from among the Ordinary Members by the general vote of the Ordinary Members residing in India; not less than six of the members of the Committee of Management must be Ordinary Members as specified by Rule IV.

13. The voting lists are circulated in the first week of November of each year, and the result of the election is declared at the Annual Meeting of the Society.

14. In the event of vacancies occurring in the Committee between the periods of election, such vacancies should be filled in by the Committee.

15. Two Vice-Presidents of the Society shall be appointed annually by the Committee of Management from amongst their members.

16. The Secretary or Joint Secretaries of the Society are elected annually from among the Ordinary Members joining under Rule IV and resident in Bombay by the general vote.

Committee of Management.

17. The Committee of Management have the general directions of the affairs of the Society and shall decide on what communications are to be published in the transactions of the Society. They keep Minutes of all their proceedings which are entered in the Minute Book of the Society, and read at the Ordinary Meetings.

18. When questions of importance to the stability and interest of the Society arise, they shall be determined by the Committee.

19. It shall form part of the duty of the Committee to give due consideration to all suggestions offered by the members of the Society. Should it be represented to the Committee that the conduct of a member of the Society is disgraceful in a professional or social capacity, or that he persistently transgresses the rules of debate, the Committee may expel him from the Society, or if they deem it necessary bring the question of his expulsion before a Special Meeting of the Society at which the votes of three-fourths of the members present are necessary to decide it affirmatively.

20. Any alteration or addition to the regulations of the Society can only be made by the Committee.

President and Vice-Presidents.

21. The President shall take the chair and conduct the business of all meetings of the Society.

22. In the absence of the President, one of the Vice-Presidents shall take the chair and conduct the business of the meeting, and in case neither be present, a member of the Committee of Management shall be elected Chairman by the Meeting.

Secretary.

23. The Secretary shall not be a member of the Committee of Management unless elected.

24. It shall be his duty to enter in the Minute Book of the Society minutes of the proceedings of all meetings and transactions of the Society, and in communication with the Committee of Management to conduct the detail of business and carry on the correspondence of the Society.

25. The Secretary shall prepare an annual statement of the receipts and disbursements of the Society to be laid before the Annual Meeting in the month of January of each year.

26. To enable the Secretary to perform these duties, suitable establishment is entertained under the sanction of the Committee of Management, confirmed at an Ordinary Meeting of the Society.

Meetings.

27. Ordinary Meetings of the Society are held in Bombay on the first Friday of every month at 4-30 P. M.

28. The chair being taken, the order of business shall be as follows:—

(1) The Minutes of the last Meeting and those of subsequent Committee Meetings to be read and confirmed.

(2) The announcement and election of new members.

(3) The reading and discussion of papers as determined by the Chairman.

(4) The announcement of presents and donations.

29. A printed copy of the papers and proceedings of the Meeting shall be forwarded to each member of the Society resident in India.

30. The transactions of the Society are published by the Secretary in communication with the Committee as often as circumstances will admit.

31. A copy of each publication is presented to the Honorary and Corresponding Members of the Society and to every Ordinary Member who at the time of publication is a contributor to the funds of the Society.

Current Medical Literature.

MEDICINE.

USE OF CAMPHORIC ACID IN EXCESSIVE SWEATING. By R. STOCKMAN, M.D. (*The Edinburgh Medical Journal*).—That camphor is a good external antihydrotic has long been known in India, where it forms a common and important ingredient in dusting powders. The use of camphoric acid seems to have been confined for a time largely to cases of tubercle of the lungs and intestine. It was then extended to cystitis, bronchitis, laryngitis, and other catarrhal conditions. Fürbringer popularised its use to check excessive sweating in phthisis. His observations were confirmed by Dreesmann, Bohland, Niesel, Combemale, and others. Dr. Stockman emphasises the value of camphoric acid in the hyperidrosis of non-tubercular cases. In phthisical sweating he thinks its value is quite comparable to that of belladonna or atropin, but in a few obstinate cases it was not quite so effectual as picrotoxin.

"The best plan is to give 30 grains at night two or three hours before the sweating is expected, or it may be given in two doses at short intervals. Sometimes I have given 15 grains thrice daily, but although this checks the sweating, it is not so efficient as one larger dose given at the proper time. It is best administered in

powder, or in capsules or cachets, as the alcoholic solution is very bitter. Owing to its insolubility, it is only slowly absorbed from the intestinal canal, and this is the reason why it must be given so long previous to the usual time of sweating. The slowness of action is undoubtedly a drawback as compared with atropin or picrotoxin, which can be given hypodermically, and act rapidly. It is excreted in the urine within about twelve hours after administration by the mouth, and hence its action is usually not very prolonged. *** It seems to be non-poisonous, even in large doses, and in this respect has distinctly an advantage over belladonna, picrotoxin, and agaricin, all of which are active poisons, and sometimes produce unpleasant effects. Fürbringer has given as much as 75 grains per day in enteric fever, and Niesel 750 grains in four weeks in a case of cystitis, without any toxic or unpleasant symptoms being produced. My own experience also bears this out, as I have never noticed any depression of the heart or nervous system."

ON A SPECIAL TRACT IN THE LATERAL LIMITING LAYER OF THE SPINAL CORD. By A. BRUCE, M.D. (*The Scottish Medical and Surgical Journal*).—Flechsigs, as is well known, differentiated the lateral columns of the cord into the crossed pyramidal tract, the direct ascending cerebellar tract, the lateral ground-bundles, and the lateral limiting layer. The first two are distinctly defined, but there is some vagueness about the exact boundaries of the two latter. The lateral ground-bundles have been further subdivided into ascending antero-lateral tract (Gower's), the descending lateral-fillet-tract (Ferrier and Turner), and the descending cerebellar tract (? Löwenthal). To Dr. Bruce is due the attempt to differentiate the lateral limiting layer. His observations are based on the study of a case of amyotrophic lateral sclerosis.

"It seems probable that the degenerated fibres in the lateral limiting layer are connected with the anterior cornua, and that the undegenerated fibres in the posterior part are derived mainly from the posterior cornua. If this is so, then the lateral limiting layer must be regarded as consisting of two almost completely independent systems which merely agree in this, that they arise in cells in the grey matter, and are fibres of short course. If it is thought under such circumstances desirable to retain the term lateral limiting layer, its constituent parts might be termed respectively *ventro-lateral* and *dorso-lateral limiting layer*."

MALIGNANT DISEASE OF THE STOMACH. By Sir R. D. POWELL, M.D. (*The Practitioner*).—This lecture deals chiefly with an interesting case of diffuse or infiltrating scirrhus of the stomach, a rare variety. The physical signs were confusing, and the diagnosis was only made after an exploratory laparotomy. The tumour was

smooth and rounded, movable, firm, and it became perceptibly harder on careful palpation, as if by intrinsic contraction, just as occurs with the uterus. The tumour was imperfectly dull on percussion, and formed a kidney-shaped swelling. There was no dilatation of the stomach, and no hæmatemesis. Vomiting was irregular, and the vomited matter was small in quantity, mucoid and greenish. It was deficient in hydrochloric acid.

At the exploratory operation Mr. Gould found "great hypertrophy of the wall of the stomach extending from the œsophageal opening to within a short distance of the pylorus. The pylorus itself was normal." She recovered from the operation, but died about 18 months after the commencement of her illness. The *post-mortem* showed that:—

"The whole stomach is involved under the mucous membrane by the indurated growth. The walls are more thickened as you approach the latter third of the stomach, less so towards the cardiac end. The organ is contracted, its calibre is very greatly diminished, the pyloric orifice is narrowed, and by the contraction of the submucous growth, which has also invaded the mucosa, the mucous membrane has been thrown into thickened *rugæ*. The glands of the gastric omentum are notably enlarged and thickened, and the omentum itself is contracted and thickened also."

The chief points of interest are that this was a very uncommon form of scirrhus cancer of the pylorus; it did not act like an obstructive growth at one or other orifices of the stomach, for scirrhus of the pylorus usually forms a hard, smooth, annular thickening, and it did not lead to chronic dilatation of the stomach, with fermentation, splashing, etc.

THE INTERNAL SECRETIONS OF THE THYROID AND SUPRARENAL GLANDS. By W. D. HALLIBURTON, M.D. (*The Practitioner*).—When the thyroid was first examined on a scientific basis, it was erroneously concluded that its function was excretory rather than secretory, that the colloid material poured into the acini by the thyroid epithelium was mucin, and that there was an accumulation of mucin in the body generally. This resulted from the confusion between mucins and nucleo-proteids, owing to some similarity in their physical properties; but they differ widely in their chemical constitution and action. Mucins and mucoids resemble each other in that they consist of proteid united to a carbohydrate radicle, which latter is convertible into a reducing sugar-like substance by dilute sulphuric acid. Whereas a nucleo-proteid is proteid combined with nuclein, the phosphorus-rich constituent of nuclei.

Gourlay and Halliburton have found that:—"The only proteid that can be obtained in any quantity from the thyroid is a nucleo-proteid;

this is derived, at any rate in part, from the colloid material in the acini; this yields no sugar on treatment with dilute mineral acid, and so is not a mucin or mucoid. It, moreover, contains phosphorus. Since the colloid makes its way into the lymphatics, it is probably this nucleo-proteid, and not a ferment, to which the thyroid treatment of myxœdema owes its usefulness. The conclusion that the active principle of the thyroid is nucleo-proteid, or its nuclein component, fitted in very well with the facts that thyroid feeding is as efficacious as thyroid injection, and that nuclein is but little affected by gastric juice. It is soluble in the alkaline juices of the intestine.

"The chief interest of the colloid is, however, derived from the observations of Baumann and Roos, who find that it contains their thyriodin, a most resistant substance. Thyriodin may be separated from the gland by the circumstance that every thing else in the organ is soluble in 10 per cent. hydrochloric acid. Hutchinson confirms Baumann's theory that the activity of the organ is accounted for by its proteid, iodine-containing constituents; after removal of the proteids, thyroid extracts are of no use. He distinguishes between the colloid of the acini and the nucleo-proteid of the epithelium lining them."

As regards the suprarenal bodies it was discovered that their complete extirpation was fatal and gave rise to symptoms resembling those of curare poisoning, *i.e.*, paralysis of the intra-muscular nerve-endings. This led to the auto-intoxication theory, which was further supported by the toxicity found on injecting fresh extracts of the healthy glands into the circulation. The toxicity of the extract was quite erroneously ascribed to nerrine, which really produces widely different effects.

Schäfer and Oliver found that the effects of suprarenal injections are those of veratrine rather than curare, and that the effect on involuntary muscles is equally well marked as in voluntary ones. "Schäfer and Oliver conclude in favour of the internal secretion theory of the suprarenals as against that of auto-intoxication; the glands doubtless form something which is distributed to the muscles and is essential for their normal tone; when the glands are extirpated, the toxic effects are the result of the absence of this internal secretion.

"The active principle is obtained from extracts of the medulla of the organ, but it is absent in cases of Addison's disease. The dose necessary to produce rise of blood-pressure is extremely minute, and this leads us to ask, What is the nature of the active principle?

"Moore found it to be identical with a powerful reducing substance which gives certain colour reactions; but his conclusions were mainly negative.

"Manasse described a reducing substance in the medulla which is similar in some of its properties to the lecithin-like material named *jecorin* by Drechsel.

"Fränkel has succeeded in separating out the jecorin-like body of Manasse and the reducing substance of Vulpian and Moore. They are distinct substances, and it is Vulpian's substance which produces the rise of blood-pressure. He therefore dubs it *sphygmogenin*."

D. M. MOIR, M.A., M.B.

EXTRACTS FROM FRENCH JOURNALS.

A CASE OF ALCAPTONURIA. By M. D. DENIGES (*Archives Cliniques de Bordeaux*, July 1896).—M. Denigès records a case of the rare condition of alcaptonuria. The patient, *æt.* 50, previously to coming under observation, had suffered from facial neuralgia and sciatica. Repeated analysis of his urine at times showed a considerable quantity of glucose, at others none. On further trial the polarimeter gave negative results, although some of the same specimen gave undoubted reactions with Fehling's solution. The specimen could not be made to ferment with *Torula cervisiae*. It darkened slowly on exposure to the air, but very rapidly after being rendered alkaline before exposure. It reduced ammoniacal nitrate of silver solution in the cold.

Three litres of urine after treatment with sulphuric acid were evaporated to 300 c.c., which were shaken up with 600 c.c. of ether. After decantation, filtration, distillation at a low temperature the syrupy residue obtained was shaken up with half a litre of water. Solution of acetate of lead to 20% of the volume was added and the whole filtered boiling. On cooling prismatic crystals separated. On purification brilliant needles separated out. Their composition was found to be that of homogentisate of lead as determined previously by Wolkow and Baumann. By heating a solution of lead salt with sulphuretted hydrogen prismatic crystals of homogentisic acid were obtained.

By experiment on the patient it was found that a nitrogenous diet increased the amount of alcapton eliminated, and the amounts of urea and homogentisic acid excreted seemed to be in the proportion of 4:1. This observation agrees with the view of Baumann that homogentisic acid arises from tyrosin, a product of the destructive metabolism of proteids. Wolkow demonstrated that the ingestion of tyrosin caused the appearance of homogentisic acid in the urine in almost a quantitative proportion.

Boedecker in 1859 was the first to draw attention to a body which he isolated having these peculiar proportions, and called aleaptone.

Fürbinger in 1875 and later Ebstein and Muller separated a substance having these powers and identified it as pyrocatechin. In 1891 Wolkow and Baumann demonstrated that the

alcapnone of Boedcker was really an acid, the homologue of gentisic acid obtained from gentian.

DISSEMINATED NEUROMA.—At a meeting of the Academy of Medicine (19th January) M. Pean showed a remarkable case of disseminated neuroma in which a large portion of the median and ulnar nerves were resected.

The patient a male *æ*t. 25, had no particular hereditary history. At four years of age numerous isolated movable swellings appeared over the body and limbs. Some disappeared spontaneously in the course of time, while others, principally on the left arm, increased considerably. These became the seat of paroxysmal attacks of pain compared by the patient to electric shocks. In some of them chronic inflammation involving the superjacent structures gradually set in. For the relief of these symptoms he sought relief. On examination the condition was found to be peripheral, the viscera were normal, the general health good. The tumours, varying in size from a pea to a nut, were subcutaneous or subaponeurotic, and in shape were flattened or rounded. One in the right half of the scrotum had the appearance of a testicle. One near the bend of the elbow was subaponeurotic and involved the large vessels, and was of the size of a foetal head at term. It fluctuated, and the skin over it was purplish evidently from pressure and looked as though ulceration would soon set in. An incision was made over it from the axilla to the bend of the elbow. The skin, aponeurosis and biceps which were stretched over it were separated, so that it presented in the wound as a white vascular membrane. On incision a large quantity of broken down clot and encephaloid matter suspended in a brownish bloody fluid escaped. The capsule, on being separated from its surroundings, was found to be in the sheath of the median nerve. The brachial artery and veins were easily separated. Other small tumours were found above and below the large one, separating the fibres of the median. It was then found that all the nerves of the brachial plexus were as thick as the little finger, and distended in places by transparent cysts containing liquid giving the impression of the spinal cord surrounded by cerebro-spinal fluid. The question arose whether or no the fluid under sheaths of the nerves affected were not distended by fluid in direct communication with the cerebro-spinal fluid around the cord.

The whole of the median nerve was exposed. The wound was sutured and primary union took place. Little relief was obtained. The swellings on the median below the elbow and those on the ulnar became very painful. The upper fourth of the median in the forearm and the ulnar from the axilla to the elbow were excised. The swelling on the right side of the scrotum was exposed. It was found to be a second right testicle united to its fellow of the

same side by a common epididymis and having one common vas deferens. A small neuroma on the epididymis, the apparent cause of the testicular pain, was removed. All the wounds were closed and healed by first intention.

It would have been supposed that mobility and sensation were permanently lost to the arm. But at the end of some weeks sensation and movement reappeared spontaneously.

Histologically the tumours were found to be pure fibromata containing neither nervous nor sarcomatous elements. The case is of great interest pathologically and physiologically from the reappearance of sensation.

The condition of polyorchidism is very rare. The cases of Hervet and Leon depend on presumptive diagnosis. In Blasin's case each of the testicles on the left side received distinct vessels, while in that of Lane the accessory testicles was small, but provided with a separate tunica vaginalis and an epididymis to which was attached a small slender funis, which became fused with the cord of the normal testicle below.

FREQUENCY OF PERITYPHLITIS IN INFANTS. By M. KAREWSKI (*Medical Society, Berlin*, 4th January).—M. Karewski drew attention to the difficulty of forming from published statistics an idea of the frequency of perityphlitis in infants.

Matteostock in 1,030 cases of perityphlitis had only 70 in children; Sonnenburg 38 in 130 total operations; Sotter 6 in 69; Karewski 14 in 41. If the statistics of the diseases of childhood are taken the incidence of perityphlitis seems surprisingly small.

Henoeh in 3,486 cases of children's diseases saw only two cases of perityphlitis; Soltmann at Leipzig only 19 in 4,912; Basch 4 in 1,313 sick children. On the other hand statistics show that it is more frequent in hospitals where the disease is operated on than in those in which it is not. The same uncertainty exists on the mortality of children operated on. Baginsky notes a mortality of 33% without counting cases fatal from secondary peritonitis. Rother gives a mortality of 66%, Israel one of 55%, Broca one of 32%, Karewski of 47%, and Sonnenburg alone has a lower mortality, one of 8%. Mortality, therefore, seems greater among children than adults and to vary with the operator, although perhaps the nature of the cases may influence the individual success.

If the diffuse is separated from the circumscribed form, the former is seen to have a mortality of 69%, the latter one of 25%. Sonnenburg has not had one fatal issue in a series of 31 cases of circumscribed perityphlitis, although in 7 cases of the diffuse form he has had a mortality of 43%.

The commencement of perityphlitis is often not recognised or taken or an attack of gastritis with constipation and hence treated wrongly with purgatives. In some cases in children the value of premonitory dyspepsia as a sign is not recognised. Perityphlitis may be con-

founded with ileus, and hence a fatal result may be produced by irrigation. Moreover diffuse peritonitis may set in, and at first give no sign of its presence. Some by considering operation hopeless, remove from the patient what is after all a very definite last chance.

R. B.

OBSTETRICS AND GYNÆCOLOGY.

PRESSURE IN THE PREGNANT UTERUS. (*British Medical Journal*).—Dr. Milne Murray, in a paper read before the Edinburgh Obstetrical Society, held that the displacement of the viscera, which occurred during the process of pregnancy, could be accomplished only by a positive pressure inside the uterus—that is, the intra-uterine abdominal pressure must be greater than the extra-uterine abdominal pressure, the amount of pressure might be extremely small; and any evidence to the contrary derived from the study of the *post-mortem* uterus or from frozen sections was fallacious, because allowance must be made for the *post-mortem* loss of tone in the tissues and for the physical phenomena of fluid interchange during the process of freezing.

DECIDUOMA MALIGNUM. (*British Medical Journal*).—Dr. Ernest Reinicke of Dresden practically strikes half the reported cases of the new disease off the list. He reviews the subject carefully, on the basis of histological research, and concludes that as yet no case of true sarcoma deciduo-cellulare has been reported. All so-called hitherto were simply instances of large-celled sarcoma of the uterus, probably proceeding from the myometrium. True transition forms between decidua cells of pregnancy and these large sarcoma cells have not been detected. Dr. Reinicke next declares that these new growths are simply coincident with and not caused by pregnancy. He believes in the second variety, that in which the malignant disease is said to originate in chorionic villi. Marehand and Gottschalk are the principal authorities, who describe this form of deciduoma. Dr. Eden has pointed out that there was doubt as to the occurrence of a preceding gestation in Gottschalk's case, and that there are reasons to believe that Marehand's cases were equally doubtful. Hence we may conclude that the existence of either variety of deciduoma malignum is very doubtful, and that the term itself should give place to "sarcoma coincident with pregnancy" as the correct denomination of the disease.

NON-LIGATION OF THE UMBILICAL CORD. (*Pacific Medical Journal*).—Dr. M. B. Kellar of San Francisco advocates "severing, cutting or bruising the cord about $2\frac{1}{2}$ inches from the navel with a dull pair of scissors, stripping the stump between thumb and finger so as to get rid of as much of the jelly of Wharton as possible, thus hastening dessication of the cord

and leaving the rest to nature without compressor or any kind of dressing, with order to nurse to bathe the little one as though it had neither cord or navel.

ELECTRICITY IN OBSTETRICS. (*Pressé Méd.*).—O. C. Sudlow announces that he has found faradization useful in promoting delivery, arresting hæmorrhage and assisting in the expulsion of the placenta. Its principal effects are: (1) its sedative action, enabling it to take the place of chloroform and chloral; (2) its oxytocic action, hastening parturition by increasing the strength and the effectiveness of the natural uterine contractions (3); it favours the expulsion of the placenta and arrests uterine hæmorrhage. The sedative action was obtained eight times in twelve and the oxytocic nine times. In twenty cases out of twenty-seven the expulsion of the placenta was materially assisted, and hæmorrhage was promptly arrested in three cases out of four. The best abdominal electrode is the hand of the operator, but a flat sponge covered with a sheet of rubber can be substituted. The positive electrode is placed on the sacro-lumbar region and the negative on the abdomen, or they can be applied on each side of the uterus, with the precaution that the current does not pass through the child's head. The sedative effect is obtained with ten to fifteen minutes of the current, gradually increasing the force until it is felt without pain. When an oxytocic effect is desired, the current should be applied stronger and intermittently stopping just short of actual pain. To favour the expulsion of the placenta a feeble current should be applied as soon as the child is delivered.

Vital Statistics & Sanitation.

PLAGUE PRECAUTIONS.

THE following telegram from the Secretary, Medical Board, Calcutta, of 3rd ultimo, is published for general information with reference to Government Notification No. 861 of 16th ultimo:—

"All native passengers and their baggage believed to have come from infected areas are now disinfected at Khana and detained under observation from twenty-four to forty-eight hours. If they show no suspicious symptoms they are then allowed to proceed. All other passengers must undergo medical inspection and are liable to detention if suspected. This supersedes my telegram of 16th February."

By order of His Excellency the Right Honourable the Governor in Council,

J. DEC. ATKINS,
Secretary to Government.

Bombay Castle, 4th March 1897.

Under Act III of 1897 the Governor in Council is pleased to

Poona.	Chinchwad.	prescribe, as a temporary regulation, that no third class passengers shall, pending further orders, be booked from the railway stations mentioned in the margin, except such persons as have obtained written permission for the purpose from the District Magistrate, Poona, or the Plague Officer, Mr. W. C. Rand, or anybody authorized by these officers in this behalf.
Ghorpuri.	Kirkee.	
Saswad.	Harapsur.	
Phursungi.	Luni.	
Alandi.	Salarwad.	
	Uruli.	

Bombay Castle, 6th March 1897.

No. 1211—710P.

Under Act III of 1897 the Governor in Council is pleased to prescribe the following rules and to authorize the Commissioners of Divisions to apply them, as a temporary measure, to any ports in the Bombay Presidency, reporting to Government from time to time the ports to which he has applied them:—

(1) Any vessel, except ferry boats (to which the rules of Government Resolution No. 883—351P., dated 17th February 1897, apply) arriving at a port, shall anchor at a place fixed for such purpose, and the passengers and crew shall be examined before she is granted entry inwards and is allowed to land passengers or cargo.

(2) If any of the passengers or crew are found by the plague authority to be plague-stricken, the patient or patients shall be removed to the nearest segregated hospital, and the vessel shall be made to proceed to the place set apart for the anchorage of such vessel. Such vessels shall not communicate with the shore or land or receive cargo for the period of eight days. Provisions, &c., shall be sent to her under directions from the Port Officer or other officer appointed for the purpose by the Commissioner of the Division and shall be passed up the side in receptacles which shall not be received back.

(3) If no further plague case occurs on board during such period of eight days, she may receive pratique. If other cases occur, the course directed in Rule (2) shall be followed for a further period of eight days respectively. The vessel shall not receive pratique, or communicate with the shore or receive cargo or receive provisions otherwise than as directed in Rule (2) until after the lapse of eight days from the occurrence of the last case.

(4) If a vessel arrives with a case of simple fever on board, the above rules shall apply to her, but the detention shall be for a period of four days, subsequent to which, if no plague cases develop, she may be granted entry inwards.

(5) If a place on shore suitable for the segregated accommodation of passengers is available, the passengers from vessels treated as above may be removed to the same and placed there under observation instead of being detained on board.

(6) Cargo unloaded from vessels which have been quarantined on account of ascertained or suspected plague on board shall be removed by the consignee to a place set apart for the purpose and exposed to the sun for a period of three days, or in the case of cargo which may have become damp until such further period as may be necessary to thoroughly dry it, after which it may be taken possession of by the consignee.

(7) Bedding, rags, &c., may not be landed from vessels aforesaid, and if landed, shall be destroyed.

(8) Piece-goods and other articles liable to carry infection brought by vessels aforesaid shall be fumigated or otherwise disinfected before being carried away by the consignee.

(9) Any grain brought to the port and landed from any vessel and found by a Magistrate to be unfit for human consumption shall be destroyed.

(10) Any port may be declared to be an infected port by the District Magistrate. Vessels arriving from such ports, even if no case of plague has occurred on board, shall not be granted entry inwards unless or until eight clear days have elapsed from the date of her departure from the aforesaid port. If the vessel arrives before the expiry of such eight days, she shall remain at the anchorage fixed for such vessels until such eight days have elapsed, subject to the conditions laid down in Rules 2, 5, and 6, after which, if no plague case is discovered on board, she shall obtain pratique. If plague is developed or has been developed before her arrival, all the above quarantine rules shall apply to her, her crew, passengers and cargo.

By order of His Excellency the Right Honourable the Governor in Council.

J. DEC. ATKINS,

Secretary to Government.

GOVERNMENT OF BENGAL.

THE BUBONIC PLAGUE.

THE following translation of the chapter on Bubonic Plague in "The Diseases of Tropics, a Manual for Medical Men," by Dr. B. Schenke, Government Physician and Sanitary Councillor at Greiz, formerly Professor at the Medical College at Kioto, Japan, is published for general information.

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DEFINITION.

While in classical times and in the middle ages the word "plague" had an indefinite pathological meaning, as it was applied according to the definition of Galen to every epidemic disease which carried off many human beings, it has latterly

been confined to a distinct disease, the Bubonic Plague. This is an infectious disease, running a very acute course, which is distinguished by the appearance of inflammation of the lymphatic glands, development of carbuncles, and general high fever.

SYNONYMS.

Loimos; Pestis Pestilentialis, Febris Pestilentialis, Pestis bubonica, Clades inguinaria, glandularia, Beulen-pest, Orientalische pest, Indische pest, Pal pest Schwarzer Tod, Plague; Peste; Mahamari "the great sickness," Ghant ka-roq "Boil-disease" Hokla-ka-roq, or Tao-ka-roq—"the coughing disease" (India) Yangtzu, Luentsu (China).

HISTORY AND GEOGRAPHICAL DISTRIBUTION.

The history of the bubonic plague can be traced back to the end of the second or the commencement of the third century before Christ. In one of Oribasius' medical extracts from Rufus of Ephesus, a contemporary of the Emperor Trajan (98-117) the plague-boils are described, and their occurrence in epidemic fashion in Lybia, Egypt, and Syria is alluded to. The first accurate historical record, however, which exists is that of the great epidemic in the 6th century which extended over almost the whole of Europe, during Justinian's reign and is consequently ordinarily described as Justinian's plague and which lasted for 50 to 60 years. In the following centuries Europe was frequently troubled by epidemics of plague. None, however, was more terrible or spread farther than the pandemic of the 14th century, known under the name of "The Black Death." No part of the then known world escaped it; even far-away Greenland fell a victim and was depopulated. According to Hecker's estimate, 25 millions of human beings succumbed to it in Europe, equal to about one-fourth of its population at that time. From the end of the 17th century epidemics began to occur less often in Europe and since the middle of the 18th, Western Europe has escaped them altogether. In Germany the plague occurred for the last time in the first and second decennium of the last century. The south-eastern part of Europe, Turkey, the Caucasus, South Russia, Italy, Dalmatia, Greece, and the Mediterranean Isles were, however, still visited from time to time by epidemics during the 19th century, for the last time in 1841. Since then Europe has remained free from the plague, with the exception of a small epidemic in Astrachan (Wetjanka) in 1878-79.

All the European epidemics of plague of former centuries were probably imported from the East, as can conclusively be proved with regard to those of later times. It has always been Turkey where they originated. Egypt, which was formerly also very frequently affected by plague, played the same part for the northern coast of Africa—the Berber states of Tripoli, Tunis, and Algiers—as Turkey did in regard to Europe as the starting point for epidemics. Since 1844 the plague has also altogether disappeared from Egypt.

Though Europe and Egypt have ceased to be the scene of plague epidemics, the disease has not been extinguished, but has shown itself down to the present time in several countries, particularly Asiatic ones. We have, indeed, only lately obtained cognizance of hitherto unknown centres of infection, which are probably, however, of old standing. The countries in which the plague has occurred since the middle of the present century, and where probably it must be assumed to be more or less endemic, are—

(1) Tripoli, where in 1856-59 and in 1874 sundry epidemics were observed in the country about Benghazi without any ascertained origin.

(2) Arabia, in the mountainous tract of Assir, on the West Coast, where plague epidemics occurred in 1853, 1874, 1879, 1889, 1890, 1892, 1893 and 1895.

(3) Mesopotamia, which was visited by severe epidemics in the years 1867-68, 1873-74, 1875-77, 1880-81 and 1892, after a period between 1856 and 1865, during which the disease prevailed in the milder form of bubonic fever, and less widely diffused.

(4) Persia, chiefly in the province of Aderbeijan, where the plague appeared in epidemic form in 1863-64, 1870-71, 1873-74, 1876-78, 1881-83, 1885-86, 1890-91, and 1892 (the first historically recorded epidemic both in Persia and Mesopotamia occurred at the end of the 16th century).

(5) Turkestan, where the plague, imported from Persia, showed itself in 1892.

(6) Upper India; and

(7) Southern China.

The first epidemic known in Upper India began in 1815 on the Island of Kutch, situated south-east of the mouth of the Indus spread in the following years to Guzerat, Seindh, and the Coast of the Ran, and lasted till 1821.

Other centres of disease are the provinces of Kumaon and Gharwal, situated on the south-western slopes of the Himalayas, where outbreaks of plague occurred in the years 1823, 1834-37, 1846-53, 1876 and 1884. The plague further occurred epidemically in 1828-29 at Hansi in the district of

Delli, in 1836, round about Bareilly in Rohilkhand and at Pali in Rajputana, and spread thence to Jodpore, the capital of Marwar, and to the State of Mewar, disappearing only in 1838.

In Southern China, plague has long been endemic, although the fact was only determined in 1878 by Rocher, an official of the Chinese Customs, in the mountain valleys of the province of Yunnan, and has shown itself from time to time also at Lienchau and Pak-hoi on the Gulf of Tong-king. From Pak-hoi it was carried in March 1891 to Canton, where it carried away within a few weeks 60,000 souls, and in May also extended to Hongkong, and later on to Amoy. In Hongkong, during three to four months, about 2,500 souls succumbed to it. In 1895 Swatow, Foochow, Macao, and other places of Southern China were visited by it.

On the southern hemisphere and in the new world the plague has never been observed.

It remains a mere matter of conjecture which of the countries in which plague has occurred ought to be regarded as its proper home. Some suspect it to be in Mesopotamia; Hirsch is inclined to place it in India. Up to the present time we are as ignorant of the disease-conditions prevailing throughout the area intervening between India and Persia as we were until recently in regard to the Chinese plague centres. There is no doubt that a very dangerous system of transporting corpses goes on between India, Southern Turkestan, Persia and Mesopotamia in connection with the desire of every Shia to be buried in Nejed and Kerbela, where the tombs of Ali and Hussein are situated, by means of which plague may readily be introduced. Thus Roux affirms that on an average 1,000 Persian corpses are imported every year into Nejed, and that in 1891, after the Persian famine, the number amounted to over 12,000.

The disease is said to have been carried from India to Southern China by way of Tibet. It is interesting that the Black Death of the 14th century was traced by contemporaries partly to Cathay, *i.e.*, China, and partly to India.

CAUSATION.

The Bubonic Plague is caused by a specific poison. If the investigations made by Yersin and Kitasato the latest epidemic at Hongkong turn out to be correct, the cause of the plague has been discovered, simultaneously and independently, by these two inquirers in the form of a short, thick bacillus with rounded ends, which shows very little power of movement. It is easily coloured by aniline dyes, unless treated by Gram's method (Yersin); its ends take the colouring easier than the middle. According to Kitasato it possesses a more or less distinguishable capsule. It is found in the buboes, in the blood, in all the internal organs, and also in the intestinal canal (Kitasato). The buboes contain the bacilli in very large numbers and without intermixture. In the blood, however, they mostly occur so sparsely that, in order to discover them, one has to look over several preparations. The bacillus has been successfully cultivated artificially (in bouillon, blood serum, most favourably at 37° Celsius, agar-agar, agar-gelatine potatoes), and on transfer to animals (mice, rats, guinea-pigs, and rabbits) has produced morbid phenomena similar to those of plague.

Already in 1841, Jablonowski discovered in the bubonic pus very active bacteria which could be cultivated in meat extract. They showed the greatest vitality at 17 to 23° Reaumur, which gradually decreased at a higher temperature up to 39°.

The plague bacilli show, according to Yersin, white transparent colonies in gelatine, with iridescent edges when looked at in reflected light. The bacilli assume the form either of slender threads or of long chains. In bouillon lumps settle on the sides and at the bottom of the glass, while the fluid remains clear.

If mice, rats, or guinea-pigs are inoculated with the bubonic pulp they are sure to die—mice after 1 to 3 days, guinea pigs after 2 to 5 days, and numerous bacilli are found in the lymphatic glands, the spleen, the liver, and the blood. Many of the bacilli lie in intranuclear leucocytes, but not in multinuclear ones. The site of inoculation shows widely extended light red oedema with sanguineous effusion round the adjoining lymph gland, which has become very large and is full of bacilli. The intestinal canal, kidneys, and suprarenal bodies are often hyperemic; the liver enlarged and red; the spleen very large and frequently permeated by a sort of small military tubercle (lymphoma?). In the pleura and peritoneal cavity there is a little fluid containing bacilli.

Transfers of the splenic pulp and of blood from one guinea-pig to another and inoculations from cultivated bacilli are also successful. Mice frequently, and rats almost invariably, succumb when fed with cultivated bacilli and with bits of spleen or liver taken from animals which have died of the plague, and at the autopsy the blood, liver, and lymphatic glands are found to be filled with bacilli.

Yersin also confined healthy and inoculated mice in the same glass chamber. The latter died first, but during the

following days the former succumbed as well, and contained bacilli in their organs. The existence of bacilli could also nearly always be demonstrated in rats, which during an epidemic were found in heaps in houses and in the streets, and which often showed real buboes; likewise in flies, which had died in Yersin's laboratory. The plague bacillus was also found in the soil of a house where an attempt at disinfection had been made, but it was no longer in a virulent condition; and of several animals which Kitasato inoculated with dust from houses infected with the plague, one guinea-pig died with the symptoms of the disease.

The plague bacillus is, according to Kitasato, killed if dried for four days; also in 30 minutes by heating up to 80° Celsius, in a few minutes by heating up to 100° Celsius, in one hour by 1 per cent. carbolic acid, and in two hours by 1 per cent. quicklime.

Yersin, Calmette, and Borrel succeeded in protecting animals, specially rabbits, by inoculation with cultivations sterilized by heating up to 55° Celsius, against subsequent inoculation with virulent cultivations and the serum of the same proved to have both a protecting as well as a healing effect. Subsequently they succeeded likewise in protecting a horse by inoculation with virulent cultivations and obtained like results.

Kitasato encountered bacilli in the blood of convalescents from the plague even three or four weeks after all symptoms had disappeared.

The plague is, in the opinion of most authors, a contagious disease, and this view obtains further support through Yersin's investigations. Some, among them Hirsch and Liebermeister, take it to be contagious miasmatic. The latter assumption is based on the often observed fact that medical men and the clergy, who by their avocations are brought into close contact with those who are affected with or have died of the plague, have escaped the disease, and in this view no value attaches to the positive attempt to transfer the disease by the English doctor, Whyte, who in 1892 fatally infected himself by means of inoculation and inoculation with bubonic pus, nor to the less disastrous results attending the inoculation of two condemned criminals in Cairo in 1835 with blood from plague patients, because these experiments were undertaken under conditions which did not exclude infection by other methods, and because the positive and negative results stand opposed to each other. According to my judgment, one must altogether agree with Greisinger, who says: In order to prove contagiousness, it is not necessary that intercourse with an infected person should be invariably followed by acquisition of the disease, but only that it should be liable to be so followed. Apparently the contagiousness differs according to the seriousness of the cases.

Infection can probably take place by the air or by touch; consequently the poison may gain access to the body by the respiratory organs or by the skin.

The time of incubation ranges from two to seven days. In particularly virulent epidemics it may take only a few hours; quite exceptionally it may last for so long as 15 days.

The poison may be spread by persons in good health as well as by lifeless objects, by personal effects which have been used by diseased persons, such as linen, clothes, bedding and the like, also by goods, and it seems to remain active for a long time (compare the conflicting results of Kitasato's investigations). A pregnant example of the transfer of the plague by infected effects is given by Hirsch from the epidemic at Wetljanka in 1878-79. The case was that of a girl ten years of age, in the house of whose parents a box of clothing had been deposited, coming from a house in which all the inhabitants had died about two months previously. The girl opened the box, which up to that time had remained untouched and was now about to be burnt. She took a piece of clothing out and set to work on it, and four days later, when the epidemic had disappeared, the first symptoms of the disease showed themselves in her. Trinevelli reports that a servant, after handling some ropes which 20 years previously had been used in the burial of plague corpses, took the disease and died of it (Netter).

Plague is also, according to Yersin's investigations, apparently spread and transferred by animals (rats, insects, etc.) According to Jablonowski, a particular species of flies played an important part in the epidemic in Irak Arabi (Mesopotamia) in 1841, their appearance and disappearance coinciding with that of the epidemic.

The poison seems to be attached to the soil, which would account for the occurrence of the plague at the outbreak of an epidemic, in animals which live in or on the ground, as has repeatedly been observed in India and China. On the occasion of the last epidemic in Canton, the seizure of human beings was preceded for two or three weeks by a great mortality among the rats, and this repeated itself in each newly attacked quarter of the town. Moreover, women and children, chiefly girls who generally stay indoors, as well as the occupants of ground-floors, were chiefly affected. The floating population escaped almost entirely, so that many people took

to living on the river. As already stated, Yersin also found plague bacilli in the soil, but not in a virulent condition.

In the countries where the plague is epidemic, the poison is probably propagated between one epidemic and the next one by sporadic mild cases of disease, which by reason of their mildness easily escape attention.

If the plague is imported anywhere, for the first three or four weeks isolated cases occur in the neighbourhood of the imported case, and subsequently dissemination of the contagion and a general spread of the disease take place. An epidemic will at times last only a few weeks or months, but may extend over several years. The abatement generally comes rapidly, but sporadic cases will still occur at times for years, and the epidemic may break out again without a renewed importation of cases from outside. The seasons of the year and the temperature have a certain influence on the initiation and development of an epidemic. A moderate warmth in conjunction with dampness seems to be the most favourable condition for it. In the cooler parts of the East, and formerly in Europe, the epidemics occurred mostly in summer. In middle Egypt, particularly in Cairo, the epidemics used to cease in the height of summer at the time of the excessive dry heat; an epidemic never commenced at that time of the year. In Mesopotamia it appears mostly in the temperate season, and totally ceases during the hot one. In the tropics proper the disease has hitherto been comparatively seldom studied (on the Western Coast of Arabia, in the Island of Kutch, in Guzerat and Southern China); the climate is rather one of the temperate than of the hot zones. By severe cold the spread of the disease seems to be restricted, but nevertheless epidemics have occurred during the severe cold of winter (at Moscow in 1771, at Astrachan in 1878-79), as well as during the greatest summer heat (at Smyrna in 1735, in Malta in 1812, in Kumaon in 1850).

Neither the geological character of the ground nor its altitude has any influence on the initiation of the disease.

On the other hand, the development and the spread of it are in a high degree favoured by bad hygienic conditions, specially connected with social misery, such as accumulation of dirt in the dwellings and on the streets, deficient removal of faecal matters and other animal dejecta, overcrowding and insufficient ventilation of dwellings. The poorer classes of the inhabitants are always affected the most, at times even exclusively, by the disease, causing Cabiadis to describe it as "miserie morbus." It among the mixed population of a town or a country the different races and nationalities are affected by it in a different degree; this is to be ascribed less to race differences than to the different hygienic conditions in which they live. During the latest epidemic at Canton the foreigners living in favourable hygienic conditions with their native servants on the Island of Shamien altogether escaped the contagion, while across the river only 50 feet wide, which separates the island from the town, many Chinese were attacked. In Hongkong, according to Ayres and Lowson, the well-housed and cleanly Europeans were attacked most rarely and comparatively lightly; the Chinese, surrounded by dirt and afraid of washing suffered the most; and between them, in respect of mortality, came the Japanese, Portuguese, Manila people and Indians. In the disappearance of the plague from Europe, the increase of cleanliness and the improvement of public and private hygiene has decidedly played an important part.

Sex is of no predisposing importance in the matter; both sexes are attacked equally. Pregnancy and lying-in afford no protection.

As regards age, those from 10 to 30 years are attacked most frequently; but younger children do not escape; and carbuncles and buboes are said to have been observed on the bodies of children prematurely born from plague-stricken mothers (Russel, Aubert-Roche). After the 50th year the disease seldom occurs.

Occupation is mostly considered as having no influence. Griesinger calls attention to the immunity of certain callings. People who have much to do with water, such as water carriers, attendants on baths, etc., and, still more, oil-carriers, dealers in oil and fat, are said to be seldom attacked.

In cases of survival of one attack, the predisposition to a second usually ceases, re-infection seldom occurs, and when it does the disease usually runs a mild course.

As predisposing causes, all those evils are cited which predispose to other diseases, such as colds, bodily and mental exertion, faults of diet, fright, fear of the disease, previous sufferings, etc.

As already mentioned, the plague also occurs in animals. Besides rats and flies, buffaloes, oxen, sheep, horses, goats, pigs, dogs, deer, and poultry are seized by it.

SYMPTOMS.

The features of the plague in well developed cases are extremely typical. One can often distinguish in its course four separate stages: (1) the stage of attack; (2) the stage of violent fever; (3) the stage of developed local symptoms, and (4) in case of recovery the stage of convalescence. Before the actual onset of the disease proper certain premonitory phenomena occasionally occur. They consist of loss of appetite, lassitude, depression, stiffness, racking of the limbs, slight giddiness, ear-ache, palpitation at times, also dull pains about the groins, the axillae, etc., where buboes subsequently appear. In most cases the disease declares itself quickly with symptoms of very severe disturbance of the general state of health and great bodily and mental weakness. Along with it exist mental delusions and heaviness of the head, violent dull headache, usually localised about the forehead and the temples, giddiness, drowsiness, or, on the other hand, unrest and sleeplessness or disturbing dreams. The face of the patient is pale and listless, the features are distorted, the eyes dull and hollow, the look staring, speech is difficult, and the walk stumbling, giving the impression of one heavily drunk. The appetite disappears; there exists a feeling of sickness, often vomiting; at times also diarrhoea occurs (the latter specially in cases ending fatally), and the patients complain of pains in the limbs and oppression of the chest. In this stage the temperature does not yet seem to rise or only inconsiderably. Also the pulse is as yet little accelerated and soft, often weak and irregular.

The stage of attack is often strongly pronounced, and may last one and even several days. In other cases, however, it is only just indicated and lasts but a few hours, and may even not occur at all, so that the high fever sets in from the commencement.

The stage of high fever is usually ushered in by one or more fits of shivering or real ague which may continue for hours; the temperature rises to 39° and 40° or even 41° and above, and shows irregular exacerbations and remissions.

The pulse is very rapid; the beats may amount to 130° and more in a minute; respiration is also accelerated up to a rate of 40 to 50 per minute. The skin has a burning hot and dry feeling; the face appears somewhat swollen; the eyes are suffused, bright but staring, the pupils mostly dilated, the hearing weakened. The tongue is swollen, and shows a white-coating like chalk or mother-of-pearl. Subsequently it becomes dry and cracked and covered, as well as the teeth, lips and nostrils, with brownish incrustations. Violent thirst is felt, and the patients are so weak that, even when quite conscious, they are hardly able to answer a question.

Gradually stupor and quiet, more seldom wild delirium, supervene, and in serious cases the patients already on the second or third day present a condition of pronounced typhus with extreme prostration. At times, however, consciousness remains perfectly clear up to the time of death. Often a slight bronchial catarrh, or, in rare instances, pneumonia, is recognisable. Continuous violent vomiting is frequently present. At times the body appears swollen from enlargement of the liver and spleen. The renal discharge is much diminished, at times even quite suppressed.

From the second to the fifth day of the illness the localised phenomena characteristic of the plague, the buboes which have been observed in more than two-thirds of all cases, make their appearance. These develop themselves most frequently about the groins, and usually further down the thighs than venereal buboes do, two or three fingers breadth beneath the femoral ring in the triangular space between the sartorius and adductor longus muscles. They also develop in the armpit, where, moreover, the most deeply-seated glands appear to be first affected; finally on the edge of the lower jaw-bone and the neck; quite exceptionally at the elbows in the bend of the knee or above the collar-bone. Usually a bubo appears only at one of the said places; simultaneous buboes at the groins, the shoulders and the neck very seldom occur. The glands of the neck are most frequently attacked in children; the swelling mostly comes on quickly, often suddenly, and accompanied by pain. At the outset they are small, of the size of a hazelnut or a walnut, but afterwards they may attain to, or even exceed the size of, a goose-egg. Their surface is either smooth or tuberculate.

Oppression, pains in the lower part of the abdomen, pains across the small of the back, seem to indicate affection of internal lymphatic glands. According to Russell's statistics, in 2,700 cases of the plague inguinal buboes were present in 1841, axillary buboes in 560, and maxillary buboes in 231 cases. Inguinal buboes occurred 175 times on both sides, 729 times only on the right side, 539 times only on the left one. Axillary buboes occurred nine times on both sides, 185 times on the right, 166 times on the left. Maxillary buboes alone occurred only 130 times and among these 67 times, in children.

Cabiadis in 1,826 cases found inguinal buboes in 720, axillary buboes in 476, cervical buboes in 98, buboes in several places at the same time in 122

Carbuncles make their appearance much seldomer than buboes, according to Lubbock only in 3 to 5 per cent. of all cases (of Cabiadis' 1,826 cases 33 presented carbuncles) ordinarily between the first and seventh day of the illness, it may be before or after the buboes, at times also without them, and almost always preceded by the occurrence of pain and burning heat in the affected sites. The carbuncles must, according to Virchow, have a great similarity to those appearing in cases of mortification of the spleen. They begin with a small, severely burning, reddish swelling, which grows quickly, extends inwardly, and forms a protuberance with one or more small blisters on the summit, which subsequently burst. The basis of the blisters mortifies into a black scab.

The swelling and the scab rapidly spread in the periphery; the extension, however, as a rule coming to an end within two days. Such carbuncles may occur in all parts of the body, with the exception of the palms of the hands and the soles of the feet; they are mostly found on the legs, the buttocks, and on the neck. They mostly occur singly; at times, however, several and even a large number may make their appearance.

With the formation of these localised phenomena, in case of a favourable development of the disease, the fever slackens coincidentally with the occurrence of heavy perspiration, the pulse becomes stronger, and it frequently falls to 90 to 100 beats in a minute. The patient becomes quieter, the expression of his face more natural, the tongue becomes once more moist, and the suffusion of the eyes and the distension of the pupils decrease.

The buboes either give off pus or subside; in the former case, which is considered to be the more favourable one, the glands again swell. After a few days the abscess ripens, opens and discharges pus, blood and loosened cellular tissue, which often gives off a very offensive smell. Healing occurs after the lapse of several weeks. In rare cases the bubo remains stationary for weeks, and maturation or subsidence then occurs.

The carbuncles cease to extend, the slough, which generally has a diameter of several centimeters, is gradually detached by suppuration, and the remaining sore cicatrises. The scars often cause considerable disfigurements. Occasionally the carbuncle develops a diffuse moist blister, which spreads rapidly and may bring about gangrene of a whole limb.

In favourable cases the improvement continues, accompanied by ample secretion of perspiration and urine, and on the sixth to tenth day of the illness convalescence commences.

At times after the formation of the localised phenomena, no remission occurs, and the typhoid condition continues up to the 15th to 20th day. In another class of cases an irregular fever occurs anew after a distinct remission, while miliary, pustules, furuncles, abscesses, mortifying erysipelas, pyoelitis and gangrenous inflammations of the mammary glands develop themselves. In such cases we have evidently to deal with secondary pyemic conditions.

A hæmorrhagic diathesis frequently appears in serious cases of plague. Patechias appear on the skin, usually on the neck, the chest and the extremities, in the form of dots, streaks or large red black or bluish hæmorrhages, which occasionally are so numerous that the whole skin is covered with them. Hæmorrhages may also occur from the nose, mouth, lungs, stomach, intestines, kidneys, female genital organs, and, in the case of females, often cause abortions. The hæmorrhages usually occur at the height of the disease, from the third to the seventh or eighth day. They may, however, appear even during the first stage.

Hæmorrhages of the lungs, which are generally of very rare occurrence in plague (of Cabiadis' 1,826 patients only six had hæmoptysis), occur so frequently in particular epidemics as to have formerly given rise to the belief that one had to deal in the latter with a separate disease, very similar indeed to the plague, but specifically distinct from it, and consequently distinguished from the Oriental plague as the Indian or the Pali plague. Thus the Black Death of the 17th century, the epidemics at Guzerat and Ahmedabad (India) in 1820, in Pali 1826, Tripolis 1874, Mesopotamia 1874-77 were distinguished by hæmorrhages of the lungs. The quantities of blood which are expectorated are mostly inconsiderable, seldom amounting to more than 15 grammes, and the accompanying symptoms consist of a short dry cough, difficulty in breathing, pains in the side and behind the sternum. The appearance of hæmoptysis is generally a very unfavourable symptom; such cases generally terminate fatally on the second day of the disease, and before the appearance of the buboes.

Death may occur in any stage of the disease, but most frequently on the third to the fifth day. Often the immediate cause is weakness of the heart, and death ensues at times quite suddenly and unexpectedly; sometimes a very frequent small, soft, hardly perceptible and often irregular pulse, coldness of the extremities with internal heat, occasionally cyanosis or lividity of the face, licecough, convulsive twitching of the muscles precede the occurrence of death. In other cases death takes place after a sudden convulsion accompanied by coma, or from exhaustion in consequence of fever, or in connection with the above-mentioned pyemic conditions.

Convalescence sometimes proceeds pretty quickly; often, however, it takes a long time, particularly in the case of prolonged suppuration of the buboes, of suppuration of internal lymphatic glands, of carbuncles, pyoelitis, abscesses of the skin or deeper situated tissues, of pneumonia or of a persistence of the typhoid condition.

Deviations from the typical course of the plague as described above, and which are often observed in the midst of epidemics, frequently occur, and are based chiefly on variations in the virulence and duration of the disease.

Firstly, there are cases distinguished by their extremely rapid course, in which with the appearance of the greatest prostration the patients succumb within from 2 hours to two days even before the appearance of the characteristic local symptoms and before any stronger reactive febrile phenomena have manifested themselves.

On the other hand, particularly at the commencement or towards the close of epidemics, and occasionally along with isolated severe cases, mild cases occur forming complete minor epidemics, in which, without any severe general suffering, buboes are formed which either mature, or after a short existence subside. Also ambulatory cases without fever have been observed, which at times quite suddenly and unexpectedly end fatally.

The duration of the disease varies between a few hours and four weeks or longer. On the average, up to the commencement of the convalescence it seems to last from 6 to 10 days. In consequence of secondary typhoid or pyemic conditions, it may, however, have a much longer duration.

The mortality is always very high. At the height of an epidemic it amounts frequently to 70 to 90 per cent. and more, and at other times it is seldom less than 60 per cent. In the hospitals at Hongkong in 1894 no less than 6 per cent. of the patients succumbed. Some epidemics form an exception, and are marked by the innocuous character of the disease. Relapses are not infrequent, and always dangerous. Secondary diseases are not often observed. There are mentioned as such, persistent suppurations of the glands and of the ears, deafness, pulmonary gangrene, great enlargement of the spleen, obtrunc bleeding of the methra, dropsy, paralysis, dumbness, mental aberrations (delirium).

Pathological Anatomy.—The corpses of those who have died of plague generally show no emaciation. *Rigor mortis* is usually moderate, and decomposition commences early. There are frequently small or large hæmorrhages on the skin, and these are often so numerous that the whole body acquires a black tint, (hence the name "Black Death") Cutaneous carbuncles, furuncles, pustules, abscesses, etc., also may be present. The brain and the meninges are congested, and the latter occasionally show ecchymosis. The subarachnoid space at times contains a serous fluid, and the ventricular fluid may also be in excess. The brain itself is usually found to be normal. The membranes of the spinal cord show changes similar to those present in the cerebral membranes. Ecchymosis occurs on the serous membranes, and sanguineous or serous effusions are often present within the serous cavities. The lungs are sometimes normal, at times bronchitis, hypostasis, pneumonia, apoplectic patches, and hæmorrhagic infarcts are present.

The heart, particularly its right half, is strongly expanded by loosely coagulated or liquid blood; its substance is frequently pale and limp; the large veins of the thoracic and abdominal cavities are also much extended by blood.

The liver is usually slightly swollen and full of blood; the bile plentiful dark and thick, and the walls of the gall-bladder are sometimes œdematous. The swelling of the liver, according to Virchow, is apparently to be ascribed to acute parenchymatous changes. Pinner and Bulard maintain that they have seen carbuncles on the liver, but have, according to Virchow, probably mistaken the erectile, dark-red swellings, which are known to occur in the liver, for such lesions. The spleen is swollen as a rule, often to double and quadruple its normal size, dark, full of blood and soft.

ANTI-CHOLERAIC INOCULATIONS.
Purulia Series (Continued from page 118).
Name of Place (Town, Buzee, Garden, Regiment, Jail, etc.): Village Belma, Thana Purulia, District Manbloom.

Date of Attack.	Particulars regarding the individual attacked with cholera.				Particulars regarding the unvaccinated people who lived in the affected house on the date of attack (including the patient, if unvaccinated).				Particulars regarding the inoculated people who lived in the affected house on the date of attack (including the patient, if inoculated), date of their inoculation and serial number in inoculation Register.						Date of death.			
	Name and Father's Name, or regimental number. Symptoms of the attack.	Caste.	Birth-place.	Date of arrival in the place.	Total number of native culprits present on the date of attack.	In the whole place.	In the affected group of houses.	Total number of people who arrived in the place during the preceding fortnight.	Name and Father's name, or regimental number.	Sex.	Age.	Serial Number in the Register.	Date of 1st inoculation.	Date of re-inoculation.		Date of recovery of the patient.		
After 3-8-96	Pelu Kamarin, daughter of Lakhani Kamar.	Kamar	Belma...	...	about 350	4	137	3	...	F	20	...	...	...	...	...	About 7-8-96
3-8-96	Kamini Kamarin, daughter of Kartic Kamar.	Kamar	.....	...	...	5	137	8	...	F	5	...	...	...	...	...	About 5-8-96
																		Pelu Kamarin, d. o. Lakhani.
																		Dulali Kamarin, d. o. Lakhani.
																		Wife of Pahlani Kamar.
																		Lakhani Kamar ..

Two persons in this house had died of cholera previous to 3-8-96.

ANTICHOLERA INOCULATIONS.

Purulia Series.

MONTH.	HINDUS.					MAHOMEDANS.					OTHER CASTES.					Grand Total.	REMARKS.
	Adults.		Children under 12 years.		Total.	Adults.		Children under 12 years.		Total.	Adults.		Children under 12 years.		Total.		
	M.	F.	M.	F.		M.	F.	M.	F.		M.	F.	M.	F.			
February 1897	159	91	13	8	271	12	3	...	...	15	729	624	81	56	1490	1776	Of these seven were done amongst the inhabitants of Purulia, 1,523 in coolie depôts at Purulia and 246 in coolie depôts at Goalundo.

Enclosure to bulletin of Anti-choleraic inoculations for February 1897.

Name of the locality where cholera occurred in houses containing inoculated inhabitants.	Number of inoculated persons present on the depôt premises and particulars of the cholera patient if he was amongst the inoculated.	Number of uninoculated persons on the depôt premises and particulars of the cholera patient if he was amongst the uninoculated.
Mr. Logan's depôt, Purulia ...	Number inoculated, 65 ...	Number uninoculated, 106. 1. Chopua, M., 30, Munda, uninoculated, attacked 18th February 1897; died 19th February 1897. 2. Bija, F., 22, Munda, uninoculated, attacked 18th February 1897; died 19th February 1897. Husband of deceased No. 2, Dasua and two children, Jaoni and Dakina, were inoculated on 14th February 1897, and Bija was uninoculated. She took cholera as stated before on 18th February 1897, and died 19th February 1897. Relatives of Chapua not inoculated.
Mr. Marcus' depôt, No. 1, Purulia	Number inoculated, 21 ...	Number uninoculated, 48. Of a family consisting of Jmra the husband, Sagni the wife, and two children, only the husband was inoculated. The wife, uninoculated, got cholera on 24th February 1897 and died 2nd March 1897.
Mr. Marcus' depôt No. 1, Purulia	Number inoculated, 33 ...	Number uninoculated, 46. In Gurubari's batch there were three souls. Sukra the husband, inoculated on 16th February 1897 and Gurubari the wife, and the child were uninoculated. Gurubari was attacked with cholera on 27th February 1897 and died 27th February 1897.
Mr. Marcus' depôt, No. 1 ...	Number inoculated, 21 ...	Number uninoculated, 48. Of a family consisting of Bangi Ramni the wife, and six children, the husband and wife were inoculated. One of the children Barrier, male child, aged 8, uninoculated, got cholera on 21st February 1897 and was cured 2nd March 1897.
Mr. Marcus' depôt, No. 1, Purulia	Number inoculated 33 ...	Number uninoculated, 46. Chutki's batch consisted of 14 coolies of which 4 were inoculated on 20th February 1897. Chutki was among the uninoculated. She got cholera on 27th February 1897 and died 2nd March 1897. She was aged 26.

The mucous membrane of the intestines and the stomach frequently shows ecchymosis, and here and there injection and increased secretion of mucus.

In the stomach there are also at times hæmorrhagic erosions and in the intestines near the ileocecal valve and extending to the vermiform process, ulcers have been found.

The mesenteric glands are usually somewhat enlarged, at times injected to a deep red or affected ecchymosis. The kidneys are often, probably in consequence of acute parenchymatous changes (Virchow), swollen and full of blood, and show ecchymosis both on the surface and on the pelvic membrane. The tissues surrounding the kidneys are also often permeated by hæmorrhages. Not unfrequently coagulated blood is found in the pelvis, and continued thence into the urethra.

The urinary bladder is at times filled with bloody urine, and its mucous membrane ecchymosed.

The most considerable, constant and characteristic changes, presented by the plague, occur in connection with the lymphatic apparatus. The exterior buboes, which may grow to the size of a goose-egg and may even attain to a weight of several pounds, specially appear, as has been already mentioned, in the glands of the groin, shoulders and neck, and frequently extend inwards, so that the groin-buboes may communicate through the inguinal ring with the glands of the sacral and lumbar plexus, and along the spine as far as the diaphragm, while the shoulder and neck buboes may communicate with each other and with the lymphatic glands in the mediastinum. The buboes are dependent on cellular hyperplasia with more or less plethora of blood and hæmorrhagic effusions (Virchow). The glandular tissue appears sometimes uniformly red, sometimes red like the dregs of wine, sometimes violet, and sometimes whitish or marbled and of marrowy, brain-like or firm, rather lardy consistency; at times it is softened to a pulp (Greisinger). The tissue surrounding the affected glands frequently shows more or less extensive hæmorrhages, and is according to Kitasato infiltrated with a reddish gelatinous exudation. Some observers (Pugnet) have detected a considerable extension of the lymphatic ducts in the vicinity of the affected glands.

Of the usual buboes confined to certain limited but moderate swelling of nearly body occurs (Aubert). Also in those cases in which the disease has ended fatally during the first days and before any buboes have developed single glands in the usual places have, as a rule, been found in a swollen condition.

DIAGNOSIS.

The diagnosis of the plague is frequently, particularly at the commencement of epidemics, difficult. In serious cases, malignant malaria and typhus may be mistaken for it; and in milder ones, venereal buboes and other lymphatic inflammations may lead to errors in diagnosis. What is decisive for the diagnosis is epidemic occurrence, i.e., coincidence with the presence of an epidemic, the extraordinarily severe general suffering accompanied by high fever and the buboes. Even although there may be exceptionally rapid cases in which buboes are absent, there will in any epidemic be cases of a typical nature, leaving no possible doubt in the matter of diagnosis.

From Dengue-fever, in which also slight swellings of the glands of the groins, the armpits and the neck do appear, plague is easily distinguishable by the severe pain of the joints and muscles, the peculiar eruption and the innocuous character proper to the former disease.

How far the bacteriological examination of the blood can be made available for the diagnosis of the plague, further researches must show.

PROGNOSIS.

The plague surpasses all infectious diseases in severity, and is therefore a very serious illness. The prognosis primarily depends on the character of the individual epidemic, which, as we have seen, may vary; and next on the age of the patients. Robust adults are comparatively the least endangered; young children and the aged are, on the contrary, said to succumb almost invariably. Once having withstood the disease gives a good prognosis.

An early appearance of buboes, their early inclination (on the third or fourth day of the disease) to suppurate, a distinct remission of the fever paroxysms with a natural expression of the face and intellect, absence of stupor, spontaneous free perspiration, day, constipation, full and regular pulse, as favourable symptoms. On the other hand, buboes on the neck, carbuncles at the back of the

neck and along the spine, hæmorrhages, strong dyspnoea, violent delirium, convulsions, considerable diarrhoea, vomiting, anuria, weak and irregular pulse, cyanosis, are regarded as unfavourable symptoms.

(To be continued.)

Appointments, Leave, &c.

BENGAL.

It is hereby notified that, under section 27 of the Bengal Municipal Act, III of 1884, as amended by Act IV of 1894, the Lieutenant-Governor is pleased to appoint Surgeon-Lieutenant-Colonel A. Tomes to be a Commissioner of the Gaya Municipality, *vice* Surgeon-Major R. Macrae, resigned.

It is hereby notified that, under sections 14 and 27 of the Bengal Municipal Act III of 1884, as amended by Bengal Act IV of 1894, the Lieutenant-Governor is pleased to appoint the Civil Surgeon or Civil Medical Officer, Balasore, to be a Commissioner, *ex-officio*, of the Balasore Municipality, *vice* Dr. J. L. Hendley.

Surgeon-Captain Frank Cecil Clarkson, Officiating Civil Surgeon of Singhbhum, is appointed to be Registering Officer under section 8 of the Inland Emigration Act I of 1882 for that District.

Surgeon-Lieutenant-Colonel R. Macrae, Civil Surgeon of Dacca, acted as a Civil Surgeon of the first class from 16th to 30th November 1896, both days inclusive.

Surgeon-Major A. R. W. Sedgfield, Factory Superintendent, Ghazipur, is allowed furlough, on medical certificate, for twelve months, under article 340 (a) of the Civil Service Regulations.

Surgeon-Captain B. C. Oldham, Officiating Deputy Sanitary Commissioner, Metropolitan and Eastern Bengal Circle, is appointed to act as Civil Surgeon of Mymensingh, during the absence, on deputation, of Surgeon-Captain J. T. Calvert, or until further orders.

Dr. W. Forsyth, Health Officer of the Port of Calcutta, is appointed temporarily to act, until further orders, in addition to his own duties, as Protector of Emigrants and Superintendent of Emigration, Calcutta, *vice* Dr. R. Macleod, who is about to retire from the service.

Surgeon-Captain B. C. Oldham, Officiating Deputy Sanitary Commissioner, Metropolitan and Eastern Bengal Circle is appointed temporarily to be a Health Officer of the Port of Calcutta in addition to his own duties.

Miss Lauder, M.D., L.R.C.P. & S., Edinburgh, is appointed to be an inspecting officer for the purposes of carrying out the provisions of the Epidemic Diseases Act, 1897, at Khana Junction, East Indian Railway.

Military Assistant Surgeon H. G. C. Mills is appointed to act as a Military Assistant Surgeon attached to the Presidency General Hospital, Calcutta, during the absence, on deputation, of Military Assistant Surgeon W. Clarke, or until further orders.

Surgeon-Captain W. J. Buchanan is appointed to act as Superintendent of the Buxar Central Jail, during the absence, on furlough, of Mr. M. S. Emerson, or until further orders, on being relieved of his present appointment as officiating Civil Surgeon of Burdwan.

CENTRAL PROVINCES.

Third grade Assistant Surgeon Boidyanath Bysack, whose services have been placed at the disposal of the Chief Commissioner by the Director-General, Indian Medical Service, reported his arrival at the office of the Administrative Medical Officer on the forenoon of the 25th February.

He is directed to do duty under the orders of the Civil Surgeon, Nagpur, until further orders.

The services of the undermentioned officers of the Indian Medical Service (Bengal) are placed temporarily at the disposal of the Chief Commissioner of the Central Provinces for employment on famine duty, with effect from the date on which they may assume charge of their duties:—

Surgeon-Captain W. H. Ogilvie, M.B., C.M.; and Surgeon, Lieutenant C. Thomson, M.B., C.M.

Surgeon-Lieutenant H. St. J. Fraser, whose services have been placed at the disposal of the Chief Commissioner, is posted to Hoshangabad for employment on famine duty.

Surgeon-Lieutenant C. M. Mathew, whose services have been placed at the disposal of the Chief Commissioner, is posted to Raipur for employment on famine duty.

Surgeon-Captain J. J. Bourke and Surgeon-Lieutenant F. A. L. Hammond, whose services have been placed at the disposal of the Chief Commissioner, are appointed Inspecting Medical Officers under the rules made under the Epidemic Diseases Act, 1897, by *Central Provinces Gazette* Notification No. 1065, dated the 11th February, and are posted to the stations of Itarsi and Nagpur, respectively.

With reference to General Department Order No. 1315, dated the 18th February, Surgeon-Lieutenant C. M. Mathew assumed charge of the office of Medical Officer, Famine relief Works, Raipur District, on the afternoon of the 20th idem.

The services of Surgeon-Lieutenant C. Thomson, M.B., C.M., who was posted temporarily to the Central Provinces by Government of India, Home Department, Notification No. 79 (Medical), dated the 4th February, are replaced at the disposal of that Department with effect from the date on which he was relieved of his special famine duties at Sanger.

With reference to Order No. 1315, dated the 18th February, Surgeon-Lieutenant C. M. Mathew reported himself at the office of the Administrative Medical Officer, Central Provinces, on the forenoon of the 19th idem.

With reference to Order No. 1314, dated the 18th February, Surgeon-Lieutenant H. St. J. Fraser reported himself at the office of the Administrative Medical Officer, Central Provinces, on the forenoon of the 23rd idem.

With reference to Order No. 1253, dated the 16th February, Surgeon-Captain J. J. Bourke, Inspecting Medical Officer, under the rules made under the Epidemic Diseases Act, 1897, assumed charge of his duties at Itarsi on the forenoon of the same date.

Military Assistant Surgeon W. A. Boucher, whose services have been placed at the disposal of the Chief Commissioner, is posted to Saugor for employment on famine duty.

BOMBAY.

Surgeon-Lieutenant K. V. Kukday, I.M.S., assumed medical charge of the Ahmedabad Central Prison on the 23rd January 1897, before office hours.

Surgeon-Lieutenant-Colonel J. McCloghry, F.R.C.S.I., to be Civil Surgeon, Karachi, *vice* Brigade-Surgeon-Lieutenant Colonel G. Bainbridge, M.D., M.R.C.P.

Surgeon-Major W. H. Burke, M.B., to be Medical Officer to the Kuthiawar Political Agency and in charge of the West Hospital, Rajket, *vice* Surgeon-Lieutenant-Colonel McCloghry.

His Excellency the Governor in Council is pleased to make the following appointments:—

Surgeon-Lieutenant-Colonel J. P. Greany, M.D., on relief by Surgeon-Lieutenant-Colonel W. H. McCannaghly, M.D., to act as Civil Surgeon, Dharwar.

Brigade-Surgeon-Lieutenant-Colonel C. T. Peters, M.B., on relief by Surgeon-Lieutenant-Colonel J. P. Greany, M.D., to act as Civil Surgeon, Belgaum.

His Excellency the Governor in Council is pleased to appoint Surgeon-Major R. J. Baker, M.D., on relief by Surgeon-Lieutenant-Colonel W. G. H. Henderson, F.R.C.S., to be under the orders of the Commissioner in Sind.

His Excellency the Governor in Council is pleased to appoint Surgeon-Captain A. J. Heath, M.B., to be Assistant Surgeon to the David Sassoon Hospital and Assistant to the Civil Surgeon, Poona, *vice* Surgeon-Major W. H. Burke, M.B.

His Excellency the Governor in Council is pleased to appoint Surgeon-Major J. P. Barry, M.B., on relief by Surgeon-Lieutenant-Colonel C. T. Peters, M.B., to be Collector of Poona for duty in the City of Poona.

His Excellency the Governor in Council is pleased to create a temporary additional appointment of Additional Health Officer of the Port of Bombay, and to appoint Surgeon-Major Crimmin, V.C., on return from Aden, to hold the appointment.

Surgeon-Captain J. B. Smith, M.B., and Brigade-Surgeon-Lieutenant-Colonel C. T. Peters, M.B., respectively delivered over and received charge of the Bijapur Prison on the 28th January 1897, after office hours.

Brigade-Surgeon-Lieutenant Colonel C. T. Peters, M.B., and Surgeon-Captain J. B. Smith, M.B., respectively delivered over and received charge of the Bijapur Prison on the 3rd February 1897, before office hours.

Brigade-Surgeon-Lieutenant-Colonel C. T. Peters and Surgeon-Lieutenant-Colonel H. McCalman, respectively delivered over and received charge of the Dharwar Prison on the 20th January 1897, after office hours.

Surgeon-Lieutenant-Colonel H. McCalman and Brigade-Surgeon-Lieutenant Colonel C. T. Peters, respectively delivered over and received charge of the Dharwar Prison on the 5th February 1897, before office hours.

Surgeon-Lieutenant-Colonel H. McCalman, M.D., Civil Surgeon, Dharwar, is allowed furlough on medical certificate for one year.

His Excellency the Governor in Council is pleased to appoint Surgeon-Captain A. L. Berradale, A.M.S., to be on special duty under the orders of the Commissioner in Sind.

His Excellency the Governor in Council is pleased to appoint Surgeon-Lieutenant W. W. Clemensha, M.B., B.S., I.M.S., and W. G. Richards, I.M.S., to be on special duty under the orders of the Health Officer of the Port of Bombay.

Surgeons-Captain A. J. Heath, M.B., and J. L. T. Jones, M.B., D.P.H., respectively delivered over and received charge of the office of the Deputy Sanitary Commissioner, Central Registration District, on 8th February 1897, before office hours.

Brigade-Surgeon-Lieutenant-Colonel W. McCannaghly, Civil Surgeon, Poona, is appointed to be a nominated Commissioner of the Poona Suburban Municipality, *vice* Surgeon-Lieutenant-Colonel J. P. Greany, resigned.

Surgeon-Major J. P. Barry, M.B., assumed charge of his duties in connection with the existing bubonic plague in Poona City on the forenoon of the 27th February.

Surgeon-Major J. Crimmin, V.C., took up the duties of Additional Health Officer of the Port of Bombay on 26th February 1897, before office hours.

Brigade-Surgeon-Lieutenant-Colonel C. T. Peters and Surgeon-Lieutenant-Colonel J. P. Greany, respectively delivered over and received charge of the Dharwar Prison on the 24th February 1897, before office hours.

Surgeon-Major P. J. Damania having been appointed to the medical charge of the Baroda Residency, assumed charge of his duties as Residency Surgeon on the afternoon of the 3rd November 1896.

NORTH-WESTERN PROVINCES AND OUDH.

Surgeon-Captain W. G. Thoreld, Deputy Sanitary Commissioner, 1st Circle, furlough out of India on medical certificate for twenty months, with effect from the 7th March 1897.

Surgeon-Captain F. H. Burton-Brown, 10th Bengal Infantry, has been granted an extension of leave for three months, on private affairs.

Acknowledgments.

JOURNALS RECEIVED.

Lancet—British Medical Journal—The Practitioner—Edinburgh Medical Journal—American Journal of Obstetrics—Dublin Journal of Medical Science—Archives of Gynecology and Obstetrics—Manual of Gynecology and Padiatry—Therapeutic Gazette—Provincial Medical Journal—The Journal of the American Medical Association—New York Medical Journal—Medical Record, New York—Boston Medical and Surgical Journal—Times and Register, London—Sanitary Reports, United States—Ocellus—The American Reporter—The American Journal of the Medical Sciences—Medical Chronicle—Times and Register—Sanitary Record—Medical Press and Circular—La Tribune Medicale—La Reforma Medica—Gazette Hebdomadaire—South Russian Medical Gazette—Archives Cliniques de Bordeaux—Gesundheitsrat—Montreal Medical Journal—Dietetic and Hygienic Gazette—Toledo Medical Compend—The Bristol Medical-Chirurgical Journal—Pacific Medical Record—Le Mercredi Medical—Annales de La Polyclinique De Lille—United Service Gazette—Indian Medical Record—Indian Medical Correspondence—Indian Medicalico da India, Goa.

BOOKS AND PAMPHLETS RECEIVED.

A Hand-book of the diseases of the Eye and their treatment. By H. R. Swanzy, A.M., M.D., F.R.C.S.I.

COMMUNICATIONS RECEIVED.

Surgeon-Capt. Vaughan, Purulia—Surgeon-Major J. H. Tull-Walsh, Midnapore—Surgeon-Capt. A. O. Fitz Gerald, A.M.S., Rangone—Surgeon-Major R. Ross, Bangalore—Bri . Surgn.-Lieut. Col. Koogan, London—Surgeon-Capt. Herbert, Bombay—Dr. M. Wilm, Hongkong—Civil Hospital Assistant Syed Mahomed Isa, Monghyr—Surgeon-Capt. Moir, Calcutta—Surgeon-Capt. Bird, Calcutta—Dr. Kedar Nath Dass, Calcutta—Surgeon-Col. K. McLeod, London.

Original Communications.

NOTES ON THE SPREAD OF THE PLAGUE IN BOMBAY.

BY SURGEON-LIEUT.-COL. T. S. WEIR,
Municipal Health Officer.

(Read at the Bombay Medical and Physical Society on March 5th.)

I DO not propose to write a paper on Bubonic Fever, but merely to draw attention to some phenomena of interest that have been observed.

We have had but little experience of the disease, and unless phenomena are repeated, it is impossible to attach importance to them. It will be most interesting to observe whether phenomena we have observed here are repeated or not. It will be well to examine some of the phenomena that preceded the appearance of bubonic fever in Bombay, and secondly, to consider some of the phenomena that accompanied it. The mean annual temperature of the year was 80·7, the second highest on record in the last 51 years. The total fall of rain amounted to 87·6 inches, being 15 inches above the average. But the distribution of the rainfall was abnormal, for instead of being distributed over four months and instead of being followed by the great atmospheric disturbances which we call *Elephantas*, the monsoon currents ceased in about two months, and the phenomena which we look forward to as announcing the end of the rainy season did not appear. The rainfall in June was 28 inches, or 8 inches above the average, and in July the rainfall amounted to 36·4, or 11·7 inches over the average. In August the rainfall amounted to 20·8 inches, giving an excess of 7½ inches over the average. The rainfall therefore was abnormal in its duration and in its incidence. It must be remembered that the sanitary effects of the annual rainfall on the public health, as the effect of rain on agriculture, depends on how the rain falls, and how it is distributed. The heavy rainfall in 1896, as we remember, flooded with sewage the low-lying portions of the city through which it rushed in swirling currents, leaving banks of mud behind to ferment; and, moreover, the sewage, after each heavy down-pour, flowed on to the streets, and in the low-lying parts of the city rushed up the traps and flowed on to the low-lying ground. Unfortunately in the beginning of the monsoon a serious obstruction occurred in the outfall channel of the sewage on the Worli foreshore. The obstruction occurred during a great storm, and it was impossible to send men down in the heavy seas to remove the obstruction. Although the monsoon practically ceased in the middle of August, the shady sides of the streets in the crowded portions of the city remained damp for long afterwards. I find a note in the last week of August drawing attention to it. In September

only 1·6 inches of rain fell, being 10 inches lower than the average. This is the most abnormal month of an abnormal year yet recorded (even in the famine years of 1876-77 the September rainfall was not less than 4 inches). And an abnormal September was followed by an abnormal October, dry and warm.

In July I was seriously alarmed by an outbreak of foot-and-mouth disease on this side of India, and it suddenly subsided in the city in August.

It will be remembered that during the rains railway communication with the city was interrupted, and that the grain was kept in the wet and was brought into the city damp. In September the godowns in Mandvi were still damp inside, and the woodwork in some of them was mildewed.

As soon as I observed the sudden outbreak of foot-and-mouth disease I became apprehensive that an epidemic was appearing, and measures commenced to be taken to prepare for great sickness. Special attention was given to the sewers throughout the city and to conservancy measures. The drainage of the district of Mandvi, in which the disease first appeared in an epidemic form, had given cause for great anxiety.

It could not have been anticipated that the monsoon current would stop as it did. Had the monsoon not ceased before the normal period, much of the removal of road detritus from the sewers of Mandvi would have been unnecessary.

Another abnormal phenomenon observed has been the disappearance of mosquitoes in some localities, and the scarcity of them in all localities of the city. At first it was conjectured that the decrease in the number of mosquitoes was due to the deficient rainfall, but as the season advanced this conjecture was observed to be incorrect, for in the middle of February, when the city surface and soil were drier than they had been for years—the water-supply inside many buildings having been cut off, and in consequence less water being used and wasted—the mosquitoes re-appeared in large numbers.

We have, therefore, the following abnormal phenomena:—

An abnormal season of rainfall that lasted only about half the normal period.

An abnormally high level of the sewage after heavy rain in the arterial sewers of the city.

Wet grain in dark and damp godowns or granaries underneath human dwellings.

And further, a balance of some 5 million gallons of water a day left in the soil—the difference between the water coming into the city and the sewage going out—a balance indicating great danger at all times.

Referring to the sudden outbreak of foot-and-mouth disease, it will be interesting to watch

whether the outbreak of rinderpest, reported in Calcutta this week, will be followed by an epidemic of bubonic fever in that city. When I use the word Bubonic Fever, it is as well to remember that this is a very old translation, although it is a name I have been charged with inventing, of an old name, viz., *Lues Inguinifera*, the name by which the disease was known in the days of the Roman Empire. The first public notification of the disease was by Dr. Viegas in the end of September, but the occurrence of the first cases in the upper stories over godowns and on the top floors suggested the view maintained by Dr. Waters that the disease was connected with the grain supply. A number of the rooms in which the first cases occurred in Mandvi faced to the east, namely, to the side of the grain stores. It has to be observed whether this fact, the occurrence of the first cases over or in grain stores, is repeated or not in other places.

The first cases that were reported to me seemed to be, from the description of the symptoms given by the friends, almost like diphtheria. This is interesting, as lately a group of 7 cases, of what may be called the diphtheritic type, were brought in from Thana to Bombay, and also a case from Andheri to Bombay. In regard to the period at which the first case in Bombay occurred, the time has not yet come to discuss it till the experiences of the medical men in this city and in the country outside have been examined; but it is not improbable that when the disease has been well recognized and its different types known—for even now, as we know, some cases are most difficult of recognition during life—it will be found that cases of a disease not dissimilar to this have occurred in former periods, not only in Bombay but in parts of the country around. We have to remember that Bombay is in free communication with parts of the world where the disease is endemic; and further that, on the Indian Frontier a similar type of disease is endemic.

The incidence of the cases in some localities, notably in Kamatipura where in each street, for days, one or two cases occurred daily, suggested an inoculator being at work. Dr. Choksey, in reference to direct inoculation, writes:—

“From observation on nearly 1,000 cases of plague at the Arthur Road Hospital, it appears that not more than about 5 per cent. of the cases show any traces of direct inoculation. And even amongst these it is not always possible to fix the exact point of entrance of the virus into the system. No case of plague from rat-bite has hitherto been observed.”

Dr. Dallas reported one case of bubonic fever following on rat-bite; the patient had been bitten on both great toes and blood oozed. He recovered. Another case of rat-bite occurred at Mandvi about the same time, but the wound proceeded to immediate gangrene, and the patient died.

I have only heard of two cases in which there has been a recurrence of the disease; the notes furnished by Dr. Godinho are published on another page.

A very remarkable coincidence occurred in a village on the north-east of the Island, namely, Koli Wadi. Fifty-one deaths occurred; the last death occurred on the 2nd of February. On that day we had disinfected a salt-water ditch, on the sides of which the people used to perform their ablutions, as they used the banks for natural purposes. It is a curious coincidence that after this day, the 2nd of February, on which the stream was disinfected and all foul matter burnt, not another case occurred. Near the Khada, Professor Hankin found a microbe identical in character with the bubonic fever organism.

The death of rats is not the first phenomenon. Previous to this there is a migration of the animals, the instinct of safety. A very remarkable instance of this occurred at a residence situated in a garden near Bandra Point. Neither in this garden nor in the house had rats been seen up to the 21st of January 1897. About that time large numbers of rats came into the garden. Ten days after, one of the servants in the house, who had not been to Bombay for weeks, died in 12 hours from bubonic fever. No other case has occurred in this building.

I submit a number of diagrams. It will be observed that the diagrams showing the total mortality and the mortality from bubonic fever indicate a number of recessions in the course of the disease. The recessions in the course of the mortality seem to me to indicate the effect of the measures taken and the intensity of the struggle.

The atmospheric condition that I have observed to produce an increase in the mortality has been a clouded sky with a still atmosphere. A clouded sky, with a strong or even cold wind, does not seem to affect the mortality. A clouded sky with a still atmosphere has always been followed by an increase in the disease.

In the diagram of one district, the market, with a population of 44,751 and 23-28 houses to an acre, it will be observed that during the week ending 4th August 1896, the total mortality was 16, that on the 17th October 1896 the first case occurred, and that during the week ending 2nd March, after the district had passed through the epidemic period, the total mortality fell to 18.

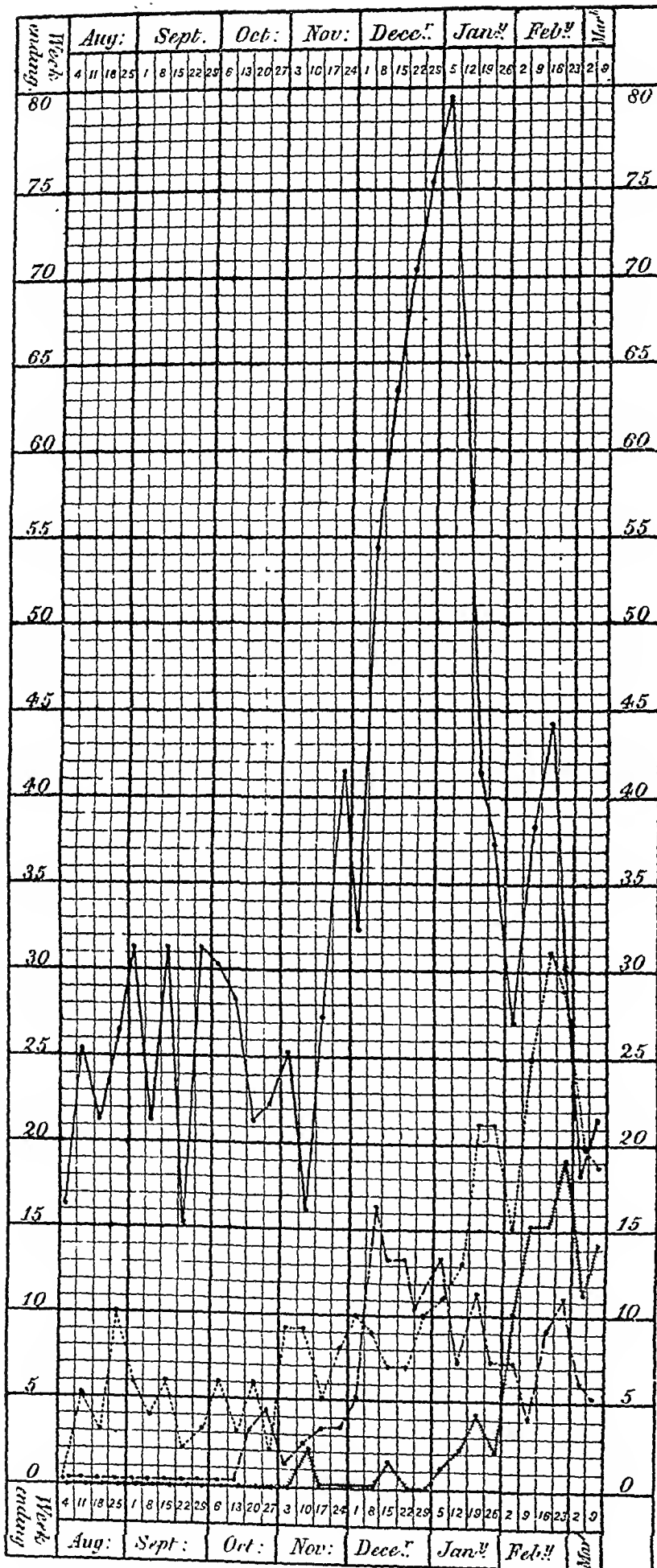
The questions of greatest importance with the knowledge we have of the organism are:—

- I. The prevention of the spread of the disease
- II. The immunity conferred by an attack.

There appear to be two stages in the development of the disease in a locality—what may be called the inoculative when sporadic cases occur, and the fungoid when the disease becomes epidemic. It will be observed from the diagram of the progress of the disease in the Walkeshwar

MARKET SECTION AND
WALKESHWAR SECTION
COMPARED.

NOTES ON THE SPREAD
OF THE PLAGUE IN
BOMBAY. By SURGN.-
LIEUT.-COL. T. S. WEIR,
Municipal Health Officer.



——— Market—All causes.
----- Walkeshwar—All causes.
..... Market—Bubonic.
-.-.-.-.- Walkeshwar—Bubonic.

district that up to a certain stage, although a number of cases had occurred in the locality, the disease did not become epidemic, but when that period—the epidemic period—arrived, the disease became epidemic. It has to be carefully observed whether there is a connection between the sporadic cases and the epidemic period that appears to always follow them.

Dr. Dimmock in October pointed out the tendency of ordinary fevers in the Byculla district to affect the glandular system, although cases of bubonic fever had not been seen in this district—up to the 20th October the disease did not become prevalent.

So far as our experience goes, it indicates that the measures of the most direct importance are, after the segregation and the treatment of the sick, or of those who are likely to become affected, the lighting and the cleaning of the inside of buildings. It is marvellous what an effect removal of the sick, even from the inside of a room to the outside or from one room to another, has on the chances of recovery. In crowded buildings and in buildings in Mandvi in which the disease first appeared we had over 600 people in a building, one family living their life in one room, opening on to one passage in which the grain was ground, and at one end of which—splashed with water, the walls and floors—the clothes were washed.

The extraordinary freedom, almost immunity, that has so far been enjoyed by the halalkhores who clean the privies and the sweepers who clean the streets and gullies, living in municipal buildings, is due, I believe, to the ventilation of the buildings in which they live. The same classes living in other buildings have suffered as much as the rest of the population.

When the disease is described as a "filth" one, the sense in which the word "filth" is used must be defined. The "filth" condition in this city that has most influenced the disease has been insufficient ventilation of buildings, and hence the measures that had most direct effect on the progress of the disease have been directed to the inside of buildings—ventilation, cleansing and disinfection, and the measures of house drainage so admirably carried out by Mr. James.

The organism does not seem to be able to virulently develop where there are free currents of air, and hence it passes by or little affects well-ventilated buildings.

I have referred to the extraordinary freedom of the halalkhores and scavengers living in municipal chawls, but a similar immunity has been observed in the case of disreputable women living in many portions of the city. Dr. Rogers Pasha and Professor Bitter who examined the municipal chawls or barracks in Kamatipura with me, and the houses of the disreputable classes in the same localities, agreed that better ventilation and less overcrowding were the conditions in

which these buildings differed from the houses around them.

The measures for the prevention of the disease that we have found most efficient are the removal of all obstructions to the admission of light and air, and the thorough cleansing and disinfection of the inside of buildings. Of disinfectants, chloride of lime seems to be the most repellent.

Crowded houses, in which goats and sheep are kept, must be flushed down with fluids such as cresol or permanganate of potash before they can be made wholesome and sweet.

In considering the measures for the prevention of the spread of the disease, it has to be remembered that the organism can be communicated to domestic animals, as may be seen from the researches and experiments of Professor Haffkine. This knowledge is most important in estimating the value and effect of the measures adopted for the segregation of human beings. It has to be determined whether the organism exists in nature outside human beings and animals before any final opinion can be arrived at.

THE HUMAN FACTOR IN THE SPREAD OF PLAGUE, AND THE LESSON IT TEACHES.

BY SURGEON-CAPTAIN B. B. GRAYFOOT.

(Read at the Bombay Medical and Physical Society on March 5th.)

MANY theories have been advanced for the cause of plague in Bombay, and its increase and spread in the city, and though I do not at present propose to discuss these various theories, I will endeavour to show what I think is the most important way in which plague spreads. I am a firm believer in the trade-route theory of the spread of plague, and consider that the bacillus was imported into Bombay; from where it is difficult to say, but it started in Mandvi close to the Docks, which are the converging point of all trade to Bombay.

From Mandvi it spread, as we all know, gradually throughout the city, and it is now spreading all over the Presidency.

I am sorry I cannot give you any statistical details of the spread in Bombay City, and that my remarks for the rest of the Presidency must be made on incomplete statistics. Perhaps at a future meeting I may be able to give you a more decided opinion based on fuller information; but anyway, I think I can even now give strong presumptive evidence of the truth of my contention, *viz.*, that the human being is the most important agent in the spread of plague. The immediate cause of the plague is, as every one knows, a bacillus, which lives and thrives where dirt and filth abound, and comes as a punishment to those who forget that cleanliness is next to godliness, and its presence is a severe condemnation of the habits and manners of its hosts. Once landed in Bombay, it found such

an ideal state of things, and such a suitable soil for its comfortable growth, that it has stayed with us for the past five or six months.

The filthy insanitary houses and chawls in which the poorer natives live, and the utter disregard most poor natives have for sanitary laws, are all-important factors to be remembered, when one considers why plague has taken such a firm hold of the city.

Filthy, ill-constructed, overcrowded houses with insanitary surroundings abound in every Indian city, and what the plagues bacillus has found congenial for its welfare in Bombay has existed wherever it has gone, and hence the reason why it is taking such a firm hold of towns in the mofussil. The plague, as we know, was in Bombay in August last, if not in July, and was not recognized until about 11th September, when Dr. Viegas first brought it to notice, and from his discovery we must date all our information and statistics about the plague.

I have before me the daily statistics of the plague in Bombay, as given by the Health Officer to the Municipality, from which it will be seen that at first only a few cases were discoverable, and during the month of October, when it was very hot, the disease seems to have decreased—to again increase in December, and run its course unchecked up to the present time. It appears now to be decreasing as the approaching hot-weather draws nearer. The history of the outbreak is well known to us all. No attempt at isolation of the sick or segregation of the healthy of infected areas has been made, and plague patients have been allowed to remain in their homes as separate foci for the spread of infection and contagion. The inhabitants of one quarter of the city have been allowed to migrate to healthy parts of the city and the mofussil, with the result that plague has increased in direct proportion to the movement of the people from one locality to another. What has happened in Bombay has also been reproduced in the mofussil, except for the past two weeks, during which efforts in the mofussil to try to isolate and segregate have been taken.

Let us now look for a few minutes at the Plague Map* of the Bombay Presidency, which enables one to have a better mental picture of the spread of the disease than the perusal of reports and statistical tables.

You will see that against lots of places in the Presidency I have put dates in red ink which indicate the day on which the first imported case was discovered. Against many of the places blue dots are placed, which mean that the plague has begun to attack local residents in these places. I would now invite attention to the statement marked A, which shows, by weeks, the number and names of places in each week

into which cases were imported. It will be noticed that week by week, since the week ending October 3rd, there has been a steady importation of plague cases from Bombay to various places in the Mofussil, from Bhatkal, at the extreme southernmost limit of the Presidency, to Palanpur in the north. If Statement A is compared with Statement B, it will at once be seen that when the disease was virulent in Bombay, during January and February, more cases were being imported into the mofussil; and the increase or decrease of the importation of cases into the mofussil varies directly with the daily and weekly increase and decrease of cases in Bombay City. Now, against some of the places marked with a blue dot, you will see a second date which marks the day on which the first local case, as distinguished from imported cases, was discovered.

In Bandra the first imported case was noted on the 25th October last, and the first local case on the 14th December.

In Poona the first imported case was reported on 8th October, and the first local case on January 2nd.

In Tanna the first imported case was on 8th October, and the first local case on or about 23rd of January. The exact date is not known.

In Bulsar the first imported case was noted on 21st November, and the first local case on 14th February, since which date Bulsar has had a very sharp outbreak of the disease.

In Bhivandi the first imported case was reported on 19th December, and local cases began on 28th of the same month. Bhivandi has suffered severely, and the epidemic is still in full force there.

At Chinchni, in the Tanna Collectorate, the first imported case was noted on 27th January, and the local cases began on the 4th February. I have not yet got full information about other places, but in a couple of weeks' time I hope to be able to fill in all the dates of the commencement of local cases. I wish to work out the time the plague takes to get possession of a place, but there are so many factors in the problem to be considered, and exact and reliable data are so often not forthcoming, that it is dangerous to dogmatize in this regard.

The interval of time between the commencement of imported and local cases varies considerably, and one is apt to think that this interval might be an index of the degree of excellence or otherwise in the sanitary arrangements of each place.

This might be so, if all the conditions in each place were similar, but in many places, like Tanna and Poona, special arrangements for the detection of cases at the railway stations were made quite early in the outbreak. Now at Bhivandi and Chinchni no such arrangements, as far as I know, existed, and we see how quickly the contagion of plague took hold of these places.

* Copies of this map are not yet ready.

As soon as I have all my figures complete, and all the information necessary, I may be able to show what effect the various conditions present at each place have on the length of time it takes for a place to be infected. It is a very interesting point, and will help us to appraise the exact value of different systems of quarantine. Information has been asked for from all districts, to be submitted in a tabular form, regarding local and imported cases, and if the deaths of rats have been noticed in connection with the outbreak. When we have received this information from all the districts, I will be able to complete my maps, and be able to estimate more accurately the value of the various points noted above in the history of the outbreak. The more I consider the question of the spread of the plague in the Presidency, the more confident I am that the various theories we have heard about the origin and spread of the plague do not give the real cause of the outbreak in the various places where plague is now raging. It is difficult to see how the bad grain theory can account for the plague in all these places, and if we allow that all the inhabitants of these places did consume bad grain for some time before they were attacked, we must also say that during all the many attacks of the plague recorded in history that the people of these different countries also ate bad grain. This seems to me a very questionable statement to make, and one which has the only merit, that it is difficult to prove it wrong. Mr. Hankin's recent experiments on the action of grain on the plague bacillus, though not yet, I believe, fully completed, tend to prove that the grain theory is utterly untenable. I also do not see how the plague could have been carried from Bombay to Palanpur by rats. That rats die in localities infected with the plague is well known, and it has, I believe, been proved that the disease they die of is plague. Rats sick of the plague probably do help to carry the infection and contagion of plague, and their deaths show that a place is dangerously infected; but I cannot believe that this vehicle of transference of plague infection and contagion is the all-important one. In an outbreak of the plague I regard the death of rats from plague in a locality as a concurrent event with the death of human beings, and do not attach great importance to it, though, as I have said before, sick rats help probably to spread contagion and infection by pollution of the soil with their excreta. It has, I believe, been proved that the plague bacillus has been found in the dust and sweepings of houses infected with plague. Whether it has been found in the air of rooms of infected houses, or whether the bacillus has a spore stage in its life-history has not, I think, been fully worked out. When the full life-history of the bacillus is worked out, we shall be better able to understand the spread of the disease. If the bacillus

exists in, and can live in, the soil, it is easy to understand why rats should get it, and why the death of rats should precede the death of human beings, because from their habits of life they are sooner brought within the sphere of action of the bacillus than the human being.

I regard plague as both infectious and contagious, but if these terms are objected to, I will call it catching. I cannot understand how we are to account for whole families, as has happened at Bandora, dying of the pneumonic form of plague in a few days, and for the rapidity with which the disease took possession of a place like Chinchni, viz., eight days after the introduction of the first case of plague, if it is not an infectious and contagious disease.

My contention is that the disease is carried from place to place by human beings, who are the dangerous and most important element in the spread of the disease, and I have my opinion on the fact that throughout the epidemics in all the places where it has now taken root in the Bombay Presidency there has been a clear and distinct history of first imported cases, and after a varying time, two weeks, three weeks, or a month and more of such imported cases, reports of cases among local residents begin.

The exact way this is brought about is perfectly clear. An infected person from Bombay goes to his native village and dies of the plague; another or perhaps half a dozen do the same. We all know what the conservancy of mofussil villages and towns is. The excreta from these cases are left to pollute the soil. And with overcrowding and bad ventilation among a poor people, filthy in their habits, and utterly neglectful of the most rudimentary sanitary laws, the conditions for the spread of an infectious and contagious disease like plague are present in a marked degree. When one goes through the reports and sees that a place has been free from plague, and that it gets locally infected after several imported cases have lived and died in the place, it seems impossible to believe that any other theory can explain the outbreak in that locality better than the obvious fact that the disease has been brought by human agency, and in this term I include their personal effects, clothing, &c.

If we are agreed upon this point, then the logical conclusion necessarily follows that in any scheme for the controlling of an epidemic in a given locality, our attention must be mainly given to the sick man and his surroundings. The recognized scientific treatment to adopt, if we want to stop the disease, is to insist on isolation of the sick and segregation of the healthy; and if these points are not attended to, we must be satisfied to let the plague run its course as it has done in Bombay. It must be either one of two things,—a scientific and rational way of treatment, or the plague unchecked. There appears to be no middle course. Unfortunately in Bombay we have elected to have the plague unchecked.

We have heard a great deal in Bombay about the difficulty and impossibility of these measures. I have never been able to prove to myself the impossibility, though I recognise the difficulty. But I should like just in conclusion to mention what has happened in Bandra. After the epidemic began to seriously increase, the people through their priests were persuaded to leave their homes, and one village through which I frequently pass did so, nearly every one leaving the village, with the result that the mortality from plague after they left their infected houses at once decreased and almost ceased. Another village quite lately had to be turned out by force, and now the people are beginning to bring their sick to the temporary hospital, showing that they have confidence in the hospital and do not resent judicious firmness. This hospital, run on the same lines as a civil hospital, has only been open three days, and it is quite full, and another pavilion will have to be built. While I was at it for an hour yesterday evening three patients were brought in of their own free will, showing that the natives do not object to go to a well equipped hospital where they are kindly treated. The people in Bandra are being turned out from infected areas and the sick treated in hospital, so that Bandra has begun to do something towards isolation and segregation, and the experiment is proving a success; and it is another instance of what a little energy, which does not recognise such words as impossible and impolitic, can do, especially when it is accompanied with firmness and kindness.

STATEMENT A.

Dates of first reported cases of Plague Bombay, 21st September 1896.

<i>During the week ending 3rd October 1896.</i>		
Ahmednagar City	...	3rd October 1896.
<i>During the week ending 10th October 1896.</i>		
Poona City	...	8th October 1896.
Thana Do.	...	8th "
Kalyan (Thana District)	...	8th "
<i>During the week ending 17th October 1896.</i>		
Kumta (Kanara District)	...	11th October 1896.
Dhulia City	...	12th "
<i>During the week ending 21st October 1896.</i>		
Pardi (Surat District)	...	23rd October 1896.
<i>During the week ending 31st October 1896.</i>		
Randra (Thana District)	...	25th October 1896.
Kathiawar Agency	...	In October 1896.
(Date not available.)		
<i>During the week ending 7th November 1896.</i>		
Bhusawal Ry. Station	...	1st November 1896.
<i>During the week ending 14th November 1896.</i>		
No fresh places were affected during this week.		
<i>During the week ending 21st November 1896.</i>		
Bulsar (Surat District)	...	20th November 1896.
<i>During the week ending 20th November 1896.</i>		
No fresh places were affected during this week.		
<i>During the week ending 5th December 1896.</i>		
Baramunda (Ratnagiri District)	...	5th December 1896.
Kurla (Thana ")	...	5th "
<i>During the week ending 12th December 1896.</i>		
Surat City	...	8th December 1896.
Karachi City	...	10th "

Jaigad (Ratnagiri District)	...	11th December 1896.
Chiplun (do. do.)	...	12th "
Ahmednagar City	...	12th "
Sadra City (Mahikanta)	...	12th "
Kapadvanj (Kaira District)	...	12th "
Bhiwadi (Thana do.)	...	12th "

During the week ending 19th December 1896.

Batikal (Kanara District)	...	13th December 1896.
Braach City	...	16th "
Pandarpur Town (Sholapur District)	...	17th "
Sholapur City	...	17th "
Sangameswar (Ratnagiri District)	...	17th "

During the week ending 26th December 1896.

Narail (Kaira District)	...	20th December 1896.
Rajapur (Ratnagiri District)	...	22nd "
Dongad (do do.)	...	22nd "
Guhagar (Ratnagiri District)	...	23rd "
Bankote (do. do.)	...	23rd "
Sangui (Satara do.)	...	24th "
Kolaba District	...	25th "
Vada (Thana District)	...	26th "

During the week ending 2nd January 1897.

Ratnagiri City	...	27th December 1896.
Malegaon (Nasik District)	...	29th "
Bassein (Thana do.)	...	31st "
Chiveli (Ratnagiri do.)	...	1st January 1897.
Harlihi (do. do.)	...	1st "
Khalgaon (do. do.)	...	1st "
Cutch State	...	1st "
Khanapur (Belgaum District)	...	1st "
Barola State	...	2nd "

During the week ending 9th January 1897.

Chikhli (Surat District)	...	3rd January 1897
Tonda (Ratnagiri do.)	...	5th "
Igatpuri (Nasik District)	...	5th "
Between Lakhtar and Wadhwan Ry. Stations	...	5th "
Shankarpur District	...	8th "

During the week ending 16th January 1897.

Karachi District	...	10th January 1897.
Talegaon Dabhada (Poona District)	...	10th "
Umbargaon (Thana do.)	...	11th "
Gowalkote (Ratnagiri do.)	...	11th "
Pophali (do. do.)	...	12th "
Hyderabad (Sind do.)	...	12th "
Tisingi (Ratnagiri do.)	...	14th "
Saugwa (do. do.)	...	16th "
Pandur (do. do.)	...	16th "
Malwan (do. do.)	...	16th "

During the week ending 23rd January 1897.

Bhote (Ratnagiri District)	...	17th January 1897.
Khed (do. do.)	...	17th "
Nandos (do. do.)	...	18th "
Gooranvad (do. do.)	...	18th "
Maudangod (do. do.)	...	19th "
Vingorla (do. do.)	...	19th "
Vada Jowdi (do. do.)	...	20th "
Kolhapur City (S. M. Country)	...	20th "
Miraj (Kolhapur and S. M. Country)	...	20th "

During the week ending 30th January 1897.

Bhatgaon (Ratnagiri District)	...	24th January 1897.
Belgaum City	...	24th "
Sarota Railway Station	...	25th "
Ohinohui (Thana District)	...	27th "
Hedwin (Ratnagiri do.)	...	28th "
Kelva Mahim (Thana District)	...	28th "
Satara City	...	28th "
Udwada (Surat District)	...	28th "
Kuntawadi (Poona do.)	...	30th "

During the week ending 6th February 1897.

Hotgi (Sholapur District)	...	31st January 1897.
Nargave (Ratnagiri do.)	...	31st "
Wajceodi (Ratnagiri District)	...	2nd February 1897.
Deognd (do. do.)	...	2nd "
Wui (Satara do.)	...	2nd "
Baramate (Poona do.)	...	2nd "
Dakore (Kaira do.)	...	3rd "
Nasik City	...	3rd "
Palghar Town (Thana District)	...	5th "
Khadavli (Ratnagiri do.)	...	5th "
Nigudal (do. do.)	...	6th "
Dabhol (do. do.)	...	6th "

During the week ending 13th February 1897.

Deoda (Ratnagiri District)	...	7th February 1897.
Rankowli (do. do.)	...	7th "
Bhim (do. do.)	...	7th "
Hedevi (do. do.)	...	8th "
Ganevi (do. do.)	...	8th "
Ankleshwar (Broach do.)	...	8th "
Junnar (Poona do.)	...	9th "
Wadi Gad (Ratnagiri do.)	...	10th "
Koti (do. do.)	...	10th "
Meelbaor (do. do.)	...	10th "
Bankewda (do. do.)	...	10th "
Talwadi (do. do.)	...	10th "
Deorakh (do. do.)	...	11th "
Dapoli (do. do.)	...	12th "
Palanpur City ...	...	12th "
Sati (Ratnagiri District)	...	13th "
Jertapur (do. do.)	...	13th "
Akola (Ahmednagar District)	...	13th "
Kalyan Railway Inspection	...	13th "
Palghar do do.	...	13th "

During the week ending 20th February 1897.

Hao (Broach District)	...	14th February 1897.
Phannegao (Ratnagiri District)	...	17th "
Hadi (do. do.)	...	18th "
Bijapur City ...	...	18th "
Rander (Surat District)	...	18th "
Akhali Tal Jowli (Satara District)	...	19th "

During the week ending 27th February 1897.

Chithle (Ratnagiri District)	...	21st February 1897.
Are (do. do.)	...	21st "
Sandole (do. do.)	...	22nd "
Chichli (do. do.)	...	23rd "
Vala (do. do.)	...	23rd "
Vadagadgere (do. do.)	...	23rd "
Koombharnal (do. do.)	...	23rd "
Saswad (Poona do.)	...	23rd "
Safa (do. do.)	...	23rd "
Myria (Ratnagiri do.)	...	24th "

STATEMENT B.

Total weekly mortality of Bombay City.

For week ending.	Total deaths, including stillborn.		Plague Mortality in 1897.
	1897.	Mean of corresponding weeks in preceding 5 years.	
August, 4th ..	564	564	
" 11th ..	598	534	64
" 18th ...	630	538	12
" 23th ...	669	581	88
Sept., 1st ..	667	540	127
" 8th ..	593	531	62
" 15th ..	618	492	126
" 22nd ..	647	506	141
" 29th ..	720	527	193
Oct., 6th ..	791	491	300
" 13th ..	634	498	136
" 20th ..	606	477	129
" 27th ..	698	470	228
Nov., 3rd ..	668	443	225
" 12th ...	623	449	174
" 17th ..	704	462	242
" 24th ..	760	446	314
Dec., 1st ..	772	457	315
" 8th ...	1,051	460	591
" 15th ...	1,310	470	840
" 22nd ...	1,416	470	946
" 29th ...	1,833	469	1,384
Jan., 5th ..	1,711	494	1,217
" 12th ..	1,638	484	1,154
" 19th ...	1,758	501	1,257
" 26th ..	1,721	518	1,203
Feb., 2nd ..	1,645	526	1,119
" 9th ...	1,911	540	1,371
" 16th ...	1,728	569	1,159
" 23th ..	1,650	542	1,108

The excess of mortality in 1897 over the mean of corresponding weeks in the preceding 5 years, is as near as one can get to the true plague mortality.

A REPORT ON THE EPIDEMIC OF BUBONIC PLAGUE AT HONGKONG IN THE YEAR 1896.*

By STAFF SURGEON WILM OF THE IMPERIAL GERMAN NAVY.

INTRODUCTION.

IN 1894 Hongkong was visited by a severe epidemic of bubonic plague, which lasted from May till September. For a considerable period after this, if we except the occurrence of a few isolated sporadic cases, the Colony remained free from the disease. In January 1896, however, there was a recrudescence of plague, the cases becoming more frequent during February and March, till in April and May the disease assumed an epidemic character. In June, July, and August, the epidemic gradually subsided.

In March 1896, by request of the Colonial Government of Hongkong, I was sent to Hongkong by the Admiral of the German Asiatic Squadron to take part in the measures for the suppression of the epidemic, and to investigate the origin and the mode of dissemination of the disease. For this purpose I was put in charge of the Kennedy Town Hospital, and of the bacteriological laboratory established there in May 1896.

During the time in which I was in charge of the Hospital, from March 14th to the end of August 1896, I treated 300 cases of plague, and examined the bodies of 867 persons that had died of the disease. These were derived from the island of Hongkong and from the adjacent mainland (Kowloon, Yau-ma-ti).

It remained for me to record my observations and investigations on the patients and in the post-mortem room; to consider the origin and the mode of dissemination of plague; and finally to discuss the measures to be recommended for the prophylaxis of the disease.

I.—THE COURSE OF THE DISEASE.

The symptoms of plague in the year 1896 were very various, according to the severity and the type of the cases. It is therefore impossible to present a simple clinical picture of the disease. I shall first describe in general terms the symptoms proper to plague, and shall then more particularly describe the various forms that are met with in practice.

The disease began in most cases without prodromata, with rigor and sensation of heat. These were quickly followed by the other symptoms, of which the principal were great prostration, fever, and glandular swelling. If prodromal symptoms occurred, these as a rule lasted only a few hours or one or two days; they were lassitude, headache, dizziness, loss of appetite, and lumbar pain.

* Translated for the Government of Hongkong by Maurice Eden Paul, M.D.

After the onset of the disease signs of a constitutional disorder followed, severe dull headache, great weakness, and overpowering sensation of fatigue. The patient showed a quite characteristic pain-drawn expression of countenance. Around the eyes, on the forehead, and on the cheeks, the skin usually assumed a blue-black colour; the skin of the eyelids became bright red; the eyes were sunken; and expression was fixed and vacant. Frequently, in addition, the difficult hesitating speech and the staggering tremulous gait, with the dulling of the senses and of the intellectual powers, early combined to give the patient an utterly stupefied appearance. Often from the beginning the patients were quite quiet and indifferent to their surroundings; frequently, however, when the sensations of internal heat and distress gained the upper hand, they threw themselves restlessly to and fro on their beds, became delirious and soon quite speechless. The delirium was usually of a muttering kind, and exhibited these characteristics, that the patient moved his hands restlessly to and fro, picking at the bedclothes, as if he were picking wool (flocilation), muttering to himself unceasingly. Sometimes, however, the delirium was of a violent character. The patients sprang from their beds, struck wildly about, and swore at those around them.

Fever was present in all cases, but varied greatly in height and duration. A regular typical fever-curve, such as is seen in most other specific febrile diseases, was never observed. Sometimes the temperature oscillated at a high level, between 39.5° and 41° C. (103° F. and 106° F.), sometimes it ranged only between 38° and 39° C. (100.6° and 102° F.). Generally speaking, the height of the temperature afforded no criterion of the severity of the case; patients with high temperatures and patients with low temperatures alike quickly succumbed. In many cases the fever lasted a few hours only, the temperature then falling to normal or to subnormal (to 35° C. = 96° F.); in many cases, on the other hand, the fever was of several weeks' duration. In 30% of the cases—70% died already within the first six days of the illness—the fever lasted from six to ten days, usually reaching its acme (39.5° to 41° C. = 103° to 106° F.) from the third to the fifth day, and then gradually falling to the normal. This course of the fever may be regarded as typical of the disease, and as having a not unfavourable prognostic signification. After this first stage of fever, in the latter course of the disease, fever of a remittent type frequently appeared. This was due to the formation of lymphatic glandular or other abscesses, a fever of suppuration, or of septic absorption, and varied in duration according to the originating cause. Ten per cent. of those patients that survived the first virulence of the disease were carried off by this secondary fever.

The skin was in all cases hot and dry. Shortly before death, cold sweats frequently occurred. No critical or lytical sweats were observed in connexion with the decline of the fever. Petechiae were seen in 3% only of the cases; they appeared in very severe cases, and shortly before death. Herpetic or varioloid eruptions occurred in 2% of the cases; icteric tint of skin also in 2%. In 3% of the patients carbuncular affections of the skin were observed; these were situated on the abdomen near the navel, on the back over the shoulder-blades, on the neck, and on the legs. They began usually as small ecchymotic spots on the skin, looking like flea-bites; these soon increased in size and became covered with small vesicles, while the surrounding skin became hard and swollen. The swellings increased in size, and their centres became gangrenous, so that ulcers of the size of a crown-piece were formed, which healed very slowly. Visible wounds of the skin existed in very few cases only; they were usually abrasions, and showed, as a rule, no inflammatory phenomena. In two cases, however, small wounds on the hand and on the upper arm respectively were red and inflamed, and were the starting-points of lymphangitis. In one case furunculosis was observed.

Outwardly visible swellings of the lymphatic glands were among the most constant and characteristic phenomena of the disease. They appeared either at the beginning of the fever, or, much more commonly, in the course of the first six days, and were very various in size and character. In 73% of the cases, in one or more parts of the body, buboes appeared, from the size of the pigeon's egg to that of the fist; in 27% of the cases the glandular swellings were smaller, from a bean to a hazel-nut in size. By careful examination, moderate swelling of the glands up to the size of a bean or a hazel-nut could usually be detected in all parts of the body. In addition to the changes in the external lymphatic glands, there was swelling of the internal glands, especially of those of the intestine; the changes in these glands will be described in detail in the section on pathological anatomy. In the cases in which buboes of considerable size were formed, their most common site was the groin, and after that, in order of frequency, the axilla, the angle of the jaw, the sub-maxillary region, and the neck. In exceptional cases only were they found at the elbow or in the popliteal space. As a rule, a bubo appeared in one of these places only; the simultaneous appearance of buboes in the groin, the axilla, and the neck, was an occurrence of the greatest rarity. In the groin, the deep-lying glands in Scarpa's space, two or three fingers' breadth below Poupart's ligament, were usually those first affected; it was seldom that the earliest bubonic swelling occurred in the upper, superficial glands, as in syphilitic bubo. Frequently,

- Of the 300 patients under my care at the Kennedy Town Hospital, 6 were Europeans (5 English and 1 Italian) and 294 non-European

1. Unilateral inguinal or femoral buboes	128 cases	= 42.6 %	(of 300 cases).
2. Bilateral	" " 10	" = 3.3 %	" "
3. Unilateral axillary buboes	" " 53	" = 1.7 %	" "
4. Bilateral	" " 0	" = 0 %	" "
5. Unilateral buboes in the neck	" " 32	" = 10.7 %	" "
6. Bilateral	" " 3	" = 1 %	" "
7. Unilateral sub-maxillary buboes	" " 3	" = 1 %	" "
8. Bilateral	" " 0	" = 0 %	" "
9. Unilateral buboes in the region of the elbow	" " 2	" = 0.7 %	" "
10. Buboes in various parts of the body	" " 8	" = 2.7 %	" "

In the six Europeans affected, there appeared at the beginning of the disease:—

1. Unilateral inguinal buboes 3 cases = 50 % (of 6 Europeans)
2. Buboes appearing simultaneously in various parts of the body 1 case = 17 % (")
3. Small, painless glandular swellings up to the size of a hazel-nut 2 cases = 33 % (")

Age, sex, and occupation had no particular influence on the course or seat of the buboes, as is shown by the following table:—

Patients suffering from plague.	With Inguinal Buboes.	With Axillary Buboes.	With Buboes at the Elbow.	With Buboes in the neck or the sub-maxillary region.	With Buboes in various parts of the body.	Without Buboes but with moderate glandular swelling.
189 men	96 = 51%	17 = 9%	.....	12 = 6%	2 = 1%	62 = 33%
51 women	21 = 41%	9 = 17%	2 = 4%	9 = 18%	3 = 6%	7 = 14%
60 children	21 = 35%	7 = 12%	.....	17 = 28%	3 = 5%	12 = 20%
Total 300 patients	138 = 45·9%	33 = 11%	2 = 0·7%	38 = 12·7%	8 = 2·7%	= 27%

Of the six Europeans attacked, two were, police inspectors, two were the six and eight

year old children of police inspectors, one was a soldier of the Rifle Brigade, and one was a sister of the Italian Convent.

The symptoms of disorder of the digestive tract were very numerous. At the outset of the disease the tongue usually became swollen, bright red at the tip and edges, and was covered with greyish-white fur. Usually, on the second or third day of the disease, the fur became brownish or blackish and dried in a crust, and the tongue sometimes became cracked and fissured, so that it soon resembled that seen in typhus and in the third week of typhoid. The lips soon became dry, and often fissured. The mucous membrane of the mouth and pharynx was usually bright red. The appetite disappeared. There was frequently uncontrollable vomiting, and great thirst, with a painful sensation of heat in the stomach and the lower part of the abdomen. The vomit was sometimes watery, sometimes bilious, sometimes like coffee-grounds. Hæmatemesis was not observed. Diarrhoea was frequent at the outset, and again in the later stages of the disease, while during the period of acute fever, constipation predominated. It was rare for diarrhoea to continue throughout the whole time of acute fever. Blood, mucus and epithelium frequently appeared in the stools. In 20 % of the cases, in which definite buboes were not formed, the intestinal symptoms were so predominant that the illness had to be regarded as essentially an intestinal affection—a view, indeed, as will be later shown, confirmed by the results of *post-mortem* examination. The parotid glands were frequently swollen and painful at some time in the course of the disease. The liver and the spleen also were often found to be painful and enlarged.

The respiratory tract showed the fewest symptoms of disease. The breathing was frequent in proportion to the height of the fever. When buboes formed in the neck in the neighbourhood of the larynx or trachea, and shortly before death when the lungs became cedematous, the breathing was labouring and dyspnoeal. In 10 % of the cases, bronchial catarrh came on in the course of the disease, most commonly appearing from the fourth to the tenth day. In 6 % of the cases, the expectoration was bloody. In one case, hæmoptysis was observed; and in one case, pneumonia, with consecutive pulmonary abscess and purulent pleurisy. Pulmonary symptoms never influenced the general character of the disease in the early stages, but appeared only when the illness was well-established; they seemed always to be secondary phenomena. Patients suffering from plague without buboes, but with prominent symptoms of disease of the respiratory organs, were never observed.

Dilatation of the right side of the heart was shown to exist in many cases. Systolic murmurs were often heard at the apex of the heart. At the beginning of the disease the pulse was,

as a rule, full and tense, and rarely irregular. The frequency was on the average 90 to 120 per minute. Before death the pulse usually became feeble, frequent, and irregular, and rose to 140 to 160 per minute.

At the beginning of the disease, the secretion of urine was frequently diminished or entirely suppressed. The colour of the urine was dark red, often turbid. In 95 % of the cases, the urine at the outset of the disease contained albumen (usually 0.1 to 0.5 %). It often contained indican. Only rarely was the urine rusty from free admixture of blood. On microscopic examination, granular casts and white and red blood-corpuscles were frequently detected. After the decline of the fever the albumen most commonly quickly disappeared from the urine; in many cases, however, traces were still present one or two months later. In three cases only was slight cedema of the legs and feet noticed in connexion with the albuminuria. In women, during the stage of fever, the catamenial flow was usually very free. In one Chinese woman abortion took place.

The nervous symptoms frequently noticed were muscular twitchings, drowsiness, loss of consciousness, and delirium of all kinds. In one case, in a boy, immediately before death, rigidity of the neck, trismus, and tonic and clonic spasms were observed.

The eyes were in some cases affected with purulent conjunctivitis, keratitis, and hypopyon. In five cases panophthalmitis occurred, and in the only one of these patients that survived complete blindness was the result.

Convalescence began at very various times. In many cases it set in at the end of the first or the beginning of the second week, after the cessation of the fever and with the subsidence of the glandular swellings; frequently, however, it did not begin to be established for four weeks or longer, the illness being kept up by suppuration of the glands and by other complication (such as new glandular swellings, abscesses of all kinds, nephritis, etc.). Recovery was not as a rule complete until from one to four months had elapsed.

The mortality of the disease among the patients in hospital was 73 %. In 70 % death took place in the first six days of the illness; in 3 %, from the 7th to the 42nd day. Among Europeans, the mortality was 50 %, both in the Kennedy Town Hospital and in the Government Civil Hospital. In the latter, of nine Europeans treated, four died. In considering the mortality among Asiatics, if we take into account those brought dead to the hospital, the mortality is greatly increased, *viz.*, to 90 %. If, however, we further take into consideration the fact that a large number of those attacked fled to Canton or were transported thither with the permission of the Government, and that a certain proportion of these recovered, we arrive at an

average mortality for the whole epidemic of about 85 %.

Sometimes death took place from a quite unexpected sudden collapse, sometimes from rapidly developed convulsions with coma, sometimes with signs of exhaustion from the intensity of the intoxication; these were usually cases in which death occurred during the first ten days of the disease. Sometimes the cause of death was an earlier or later developed septic or pyæmic condition; this occurred in the later stages of the disease.

The order of appearance of the symptoms as well as the intensity and duration of the disease were, as already frequently mentioned, extremely various in different cases.

At first, during the height of the epidemic, the cases were for the most part very speedily fatal. Signs of the most intense depression of the nervous functions rapidly came on. The patients became drowsy and silent, and passed into a restless, comatose condition, vomited occasionally, passed their motions under them, became cold, with a hideous, livid, corpse-like tint of face, and died usually within from twelve hours to two days from the onset of the illness, with high fever, or sometimes subnormal temperature or moderate fever only, and frequently without any outwardly recognizable buboes.

Very near in degree of danger to these extremely fatal cases, were cases in which an unusually high grade of fever soon came on, showing occasionally remissions and irregular exacerbations, with severe epigastric pain and tendency to vomit, and with the secretion of urine almost entirely suppressed. In these cases buboes usually developed, and the patient died of exhaustion on the third, fourth or fifth day of the illness. If, however, he survived, he suffered usually for a long time from suppuration of the glands, or from the formation of abscesses, or from other complication such as *lephritis*, pneumonia, or parotiditis.

Besides these severe cases of plague, slighter cases were also met with, which were especially frequent towards the end of the epidemic. In these cases the above-described symptoms were developed only in a minor degree. The urinary secretion was normal. Buboes sometimes appeared and quickly suppurred or underwent resolution; ordinarily, however, slight glandular swellings only were to be detected. The course was generally quick and favourable. Even in some of these cases, however, death occurred suddenly and unexpectedly. Quite exceptionally, ambulatory cases were seen, almost a febrile, with a somewhat tedious course, characterised by the development of small buboes, or even merely by pain without discoverable swelling in the inguinal or axillary region or in various parts of the body.

According to the symptoms bubonic plague may be defined in general terms as an extremely

malignant acute disease, with pronounced typhoid state, in the course of which buboes and abscesses usually, and carbuncles very rarely, appear.

(To be continued.)

SERUM TREATMENT AGAINST RABIES.

BY SURGN-MAJOR G. M. SHEWAN.

"RABIES" I have written and not "Hydrophobia" that I may not be posted for belief that a serum treatment could have more than theoretical interest where "vaccinations" could be applied. As far as we yet know a serum treatment could never be a method of choice.

But for long now we have known there is only a preventive and a palliative treatment for the disease. We have seen that its incubation is shortened by the number, the extent and the position of the bites. Children, it is known, are the most often bitten on the parts of the body that lend to its most rapid development, and its onset in children,—as in experimental rabies in young animals,—is much more rapid than in adults. We have further come to know that in rare cases hydrophobia declares itself in 9, 10, or 15, days, and yet, with all this, and with Pasteur's rule "*le plus tôt possible*" ringing in our ears, we have contentedly looked on at a privileged few, delaying, perhaps at enormous risk to themselves, and travelling for treatment to Paris.

Given the difficulty in procuring a "*traitement pastorien*," that only we appear to have seen, and given the prevailing uncertainty as to exact difference between the physiological defensive actions of a so-called vaccine on the one hand and our acting serums on the other, it would appear that we have had no excuse in so long neglecting to employ a serum treatment as the best treatment available here. Pasteur's treatment, of course, is by injection of emulsions of the spinal cord of rabbits killed with his "*virus fixe*." The extracted cords are made to lose virulence gradually by drying.¹ In the "*ordinary*" treatment we begin by injecting emulsion of cord that has been drying for about 14 days, and from that during a certain interval, we progressively go near or actually up to fresh cord. In his so-called "*intensive*" treatment, however, the injections are made much more rapidly. Fresh cord is there used almost at once, or we run up to it in a very much shorter time.

¹ After describing his way of trepanning and "*directly*" inoculating rabbits up to the "*virus fixe*" or "*virus de passage*," Pasteur goes on to say * * * "*Rien de plus facile, en conséquence, que d'avoir constamment à sa disposition, pendant des intervalles de temps considérables, un virus rabique d'une pureté parfaite, toujours identique à lui-même, on a très peu près. C'est là le noeud pratique de la méthode*"

"Les moelles de ces lapins sont rabiques dans toute leur étendue avec constance dans la virulence."

"Si l'on détache de ces moelles des longueurs de quelques centimètres avec des précautions de pureté aussi grandes

As cause of rabies we have undoubtedly to do with a living organism—a microbe,¹—but until we know more we can only refer to “the virus.” In our one established protecting treatment this virus is injected with the altered nerve tissue in which it had grown. Should we then say that it is to the virus, acting like the microbe of anthrax in Pasteur’s vaccination against that disease,² that we owe the protection, or have we to do with a more direct action of the altered nerve tissue itself? Pasteur himself supposed that, in his injections (i.e., emulsions of infected cord), we had an “élément virulent” and an “élément vaccinant” and that during the drying of the cord the first disappeared much more rapidly than the second. Practically, I may say, we have no more light since Pasteur suggested that, and his suggestion is singularly supported, some think, by the effects of a serum treatment against this same disease.

Bouchard conferred an immunity on animals with the fluid obtained by filtration from rabies infected nerve tissue, and Babès and Lepp afterwards succeeded with the same, sterilised at 80°C.

The first trials of a serum treatment against rabies were reported by Babès and Lepp (Ann. Inst. Pasteur, 1889, p. 384). These authors injected the blood of dogs vaccinated, and of four dogs they had so treated, two survived inocula-

tion by trepan. The rabbits treated in the same way all gave a much longer incubation after inoculation than did control animals.

Following on this, the experiments of Babès, and Cérchez then appeared (Ann. Inst. Pasteur 1891, p. 629). These writers had obtained the same results with a serum, and had also found that the blood of immunised dogs had power of neutralising the virus *in vitro*. Encouraged by their experiments they had gone on and applied the serum treatment to man. In 12 cases they had so treated, there was one death only. Judging therefore from those 12 cases, though there is a value in the method, it is shown to be inferior to Pasteur’s.

Next came Guido Tizzoni and Schwartz (Riforma Medica, 1892) with conclusions all in support of Babès. They showed that his results were only the less convincing because of the animal he had chosen to work on. They themselves had found that to neutralise the poison *in vitro*, the blood of immune rabbits was much more active than that of dogs, and they showed that the power of any such serum varied with the degree of vaccination undergone by the animal providing it. They had seen that if an animal came to die after a prolonged survival through treatment, the virus in its nerve tissue was never attenuated, but would kill control animals in the usual time, and they therefore had reason to conclude that the protecting serum acts directly on the organism and not on the infecting virus. They had also tried to isolate the substance to which such a serum owed its protecting power, and they found that it did not dialyse, that it was precipitated by alcohol, or by sulphate of magnesia, and that it was very soluble in glycerine. At any rate they established that the blood of vaccinated animals contained an immunising substance, which isolated and injected in doses of 18 to 25 c.c. during five or six days, would protect other animals from the disease.

Recently Babès and Talasescu, in going on to establish the use of a serum against rabies, have drawn attention to the fact that the serum of vaccinated animals, is the most powerful for animals of the same kind; that the serum of the immunised rabbit for instance is above all powerful on the rabbit, and that of the dog, upon the dog.

I have already said that with our “vaccination pastorienne” established we need not think of a serum treatment, but at the end here I would withdraw that statement and say that with the knowledge now attained we should have strongly immunised animals available for serum treatment, distributed throughout India, in any case

quil est possible de les réaliser, et qu'on les suspende dans un air sec, la virulence disparaît lentement dans des moelles jusqu'à s'éteindre tout à fait. La durée d'extinction de la virulence varie quelque peu avec l'épaisseur des bouts de moelle, mais surtout avec la température extérieure. Plus la température est basse et plus durable est la conservation de la virulence. Ces résultats constituent le point scientifique de la méthode.”—Comptes rendus, 26th Oct. 1885.

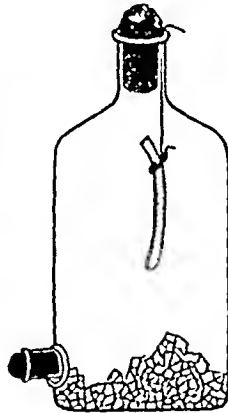
I have italicised a sentence in the above to remark that with our rabbits, our climate, and for other reasons, in vaccinating here, we could not adhere strictly to Paris rules. We might learn much from the “bacteriologist” Institute long ago established at Saigon, and where, it appears, they take much advantage of the fact that infected cord will keep for four weeks in glycerine without losing much of its virulence.

I draw here Pasteur’s “flacon à tubulure inférieure” containing the drying salt and a piece of cord hanging.

¹ Roux has said: “La résistance du virus aux agents physiques et chimiques est à peu près la même que celles des microbes qui ne forment pas de spores.”

² In speaking like this I must take care to note that vaccination against anthrax may be determined not only by injecting the living microbe but by the secretion products alone. There is the yet unexplained difference, however, that vaccination with the germ is more powerful and more durable. As yet a serum has proved useless in anthrax.

³ By this Babès claims priority as discoverer of preventive power in serum. His procedure here, however, was really so close to that of Richet and Héricourt who in the previous year had strengthened a natural vaccinating power in dogs’ serum by inoculating with the “staphylococcus pyosepticus” that it is difficult to decide as to whom the credit should fall.



NOTES ON SOME CASES OF MALARIA AMOEBA COLI AND CERCOMONAS.

By SURGEON-MAJOR RONALD ROSS, D.P.H., I.M.S.

THE following notes refer to cases of parasitism detected by myself and by Assistant-

Surgeon Appia of the Bowring Civil Hospital, Bangalore. During the last seven months we have found 51 cases of malaria. These were examined either for diagnostic purposes or in the search for good crescent cases for investigation in respect to the mosquito theory, and were not dealt with at all exhaustively. Cases which gave negative results on a first examination were seldom looked at again, and, when they were, failed to yield in a single instance a positive result on a second or third examination. The positive cases gave results as follows:—

- 22 remittent fever (æstivo-autumnal) parasites;
- 13 intermittent (spring) tertians;
- 4 quartans;
- 5 cases of "eye-forms" only;
- 2 cases of remittent and tertian mixed;
- 2 of pigmented leucocytes only (one specimen each);
- 1 of remittent, tertian and quartan all together;
- 1 of remittent plus eye-forms; and
- 1 of eye-forms plus pigmented leucocytes.

The specific characteristics of the different varieties were quite distinct and immediately recognisable. All cases of small rings were followed by crescent except in one case where I hoped for a large crop of the latter, but found none at all, owing I believe to the exhibition of a few doses of quinine at the end of the febrile period. With respect to statements lately made in the *Indian Medical Gazette* by Surgeon-Colonel Oswald Baker and Surgeon-Major Tull-Walsh that they find crescents, but rarely it should be remarked that these set in sometimes not until one week or even ten days after the subsidence of the remittent fever, so that a person not clearly cognisant of this fact may easily miss them, I have found crescents readily enough in Secunderabad, Poona, Bangalore, and Madras, and in cases coming from numerous outlying districts. All cases of remittent fever are pretty sure (or quite sure) to have them unless cinchonised. I have, however, had cases of old remittent cachexia in which I have not actually found them, though there were still occasional crops of fever forms. I suspect it is merely a question of thoroughness of examination.

The time taken to make a microscopical diagnosis were noted in all the above 51 cases, and were as follows:—

Nineteen cases were diagnosed in under thirty-seconds from the time of bringing the glass to a focus; 16 were diagnosed in between thirty and sixty seconds; 5 in between one and two minutes and the rest, mostly cases of rare crescents and eye-forms, namely, sixteen cases, in under six minutes. In short, in about 70% of positive cases, the parasite was found within one minute. Making the specimen (liquid method) takes about one minute or less; so that we can scarcely complain of the tediousness of the process.

The eye-forms mentioned above are those referred to in my paper in the *Indian Medical Gazette* of March 1896. I fear I do not know exactly what they are, but have been struck with their similarity to the Texas cattle fever parasite. I think that some of them at least are parasitic; others may be bacteria within the corpuscles. Some may be very young spores; a view supported by the fact that they may be met in company with ordinary malaria parasites, and that then their appearance seems to be periodic. In five cases, however, they were alone, were in large numbers, were accompanied by severe and long continued fever, and disappeared as the fever abated. Owing to press of work, however, the cases were not taken sufficiently thoroughly for publication in detail. Crescents did not follow the fever.

None of the cases presented any points of divergence from accepted characteristics. In Bangalore we have only remittent and tertian intermittent parasites; while in Madras, as Surgeon-Colonel Sturmer informs me, quartans are by far the commonest. I should like to iterate my belief that the younger parasites are never free in the serum; this appearance is produced by the rupture of parasite, bearing corpuscle during the process of making the specimen or under pressure of the cover-glass.

Having worked chiefly with a view to discovering good crescent cases, I made no formal scrutiny of patients yielding negative results on a first inspection. This is work for a much required special investigation. I must note amongst these, however, several cases where a daily rise of temperature took place persistently for weeks. These were not malarial. One proved to be syphilitic; the others showed no cause for the quotidian fever, which, moreover, was too regular and persistent to be of malarial origin, and did not yield in the slightest to quinine. Continued fever of course gave negative results.

Lately we have regularly examined for amœba and cercomonas and have found no less than thirteen cases of these parasites within about one month. These are briefly as follows:—

Case 1.—M., aged 20 years. Dysentery—A relapse after former cure by ipecacuanha. Numerous amœbæ (up to seven in a field) found in the blood and slime of the stools, but not in fecal matter. Movements were sluggish below 78°F., and ceased after about 8 hours. Individuals differed in amount of granulation, number of vacuoles and distinctness of nucleus. One contained (clearly within it) no less than six red corpuscles which it carried about with it. The amœbæ disappeared under ipecacuanha as the motions became entirely feculent.

Case 2.—M., aged 45. Fatal diarrhœa.—Came from hospital with acute diarrhœa. No vomiting or suppression of urine (cholera not present in the station). Motions contained no

red or white blood cells, but had large numbers of amœba coli and a considerable number of cercomonads intestinalis, both in the midst of the liquid faecal matter. Was much emaciated on admission (being a beggar) and died on third day. Large intestine only examined 5 hours after death. No lesions. Scrapings of mucous membrane and adhering fluid showed only a few amœbæ and cercomonads mostly dead or motionless. Small intestine; liver and spleen appeared quite healthy.

Case 3.—M., aged 4½. Chronic diarrhœa, œdema of extremities, and bronchitis. Large numbers of cercomonads; also eggs of trichoccephalus. Was removed from hospital, but brought back a fortnight later in a dying condition. No *post-mortem*. The eggs had disappeared before death, but cercomonads swarmed.

Case 4.—M., aged 20. Dysentery (acute) and anchylostomiasis, great anæmia. Numerous amœbæ found only in the blood and slime; also eggs of doelmius and ascaris. Treated with ipecacuanha, thymol and santonine, under which the parasites have disappeared. Is still anæmic but much better.

Case 5.—M., aged 18. Dysentery (acute), anchylostomiasis, filariasis, trichoccephalus, ascaris and oxyuris. Numerous amœbæ found only in blood and slime of motions; also eggs of anchylostoma, trichoccephalus round and thread worms in large numbers. As this patient came from Coromandel Camp, Kholur Gold Mines, from which I had just had a case of filaria nocturna, and as he had so many parasites I determined, without any other indication, to examine the night blood. Filaria nocturna in very small numbers. The intestinal parasites have disappeared under ipecacuanha, thymol and quinine; but anæmia, night-fever and restlessness remain. The Sanitary Commissioner, Mysore, was addressed on the subject of the Coromandel Camp water, which, however, proves to be drawn from an excellent source by pipes. This and the former case of filariasis must therefore have drunk from another and worse source in the neighbourhood.

Case 6.—M., aged 60, native. Chronic dysentery and hepatic abscess a few amœbæ and large numbers of cercomonads in stools. Amœbæ in sanguineous pus obtained by scraping wall of abscess with a probe died. No *post-mortem* available. Towards the end of the case incessant diarrhœa (motions swarming with cercomonads) set in but without amœbæ or dysenteric symptoms. There were not many amœbæ in the pus.

Case 7.—F., aged 3½, continued fever and diarrhœa (possibly infantile enteric). East Indian. Swarming with cercomonads. Died. No *post-mortem*.

Cases 8 and 9.—European children, aged 4 and 2½ years, being two of a family of three, all

of whom are extremely sickly, emaciated and anæmic, the third child much less than the others. Cases 8 and 9 have been ill for a month with diarrhœa. Case 8 suffers from occasional inability to walk. Case 9 is almost a skeleton. Neither had dysentery symptoms, but continual thin yellow stools. In Case 8 there were large numbers of amœbæ in the midst of faecal matter, and both swarm with cercomonads. The third child has neither (only two specimens examined). No worm's eggs. Are improving under quinine and thymol, especially the latter.

Case 10.—M., aged 50, native. Dysentery followed by persistent diarrhœa. Amœbæ found only in blood and slime. Very numerous cercomonads in diarrhœa. The amœbæ vanished after ipecacuanha but the cercomonads were unaffected by this drug, though they appeared to yield to thymol, 10 grains daily. A 5-grain rectal injection of nitrate of silver has suddenly checked the diarrhœa, and the patient, whom I scarcely expected to live, is much improved.

Case 11.—F., aged 7. Enteric fever (?) The patient and her sister both had high fever with occasional diarrhœa, not very typical of enteric. A few cercomonads in the patient's stool. The sister not brought to hospital.

Case 12.—F., aged 2. Continued fever and diarrhœa, followed by pneumonia, very numerous cercomonads.

Case 13.—F., aged 16 months. Slight chronic diarrhœa and occasional fever. Very numerous cercomonads in loose stools. Not examined for malarial parasites.

As I expect to leave the station shortly, I am obliged to give some of these cases before their termination. In the dysenteric stools when blood or slime were found combined with fairly hard stools amœbæ were almost always seen only in the former. Hence I cannot help thinking that they are intimately connected with the ulcerative process. Where diarrhœa exists together with amœbæ (Cases 2, 8 and 10) cercomonads also have always been present; and it may be that, so to speak, the diarrhœa washes away the amœbæ from the surface of the mucous membrane and so mixes them with fecal matter. The cercomonads have always been found in very liquid stools, and have disappeared as the stools became harder. They appear to be affected neither by quinine nor by ipecacuanha. I forgot to mention that Case 7 was taking much quinine without effect on these parasites. We have twice seen cercomonads attached to red corpuscles and pulling them about by means of the terminal filament (*vide* Leuckart). Apart from existing literature and judging only from the above cases, I should be inclined to think that the amœba is connected with one form at least of dysentery, and that the cercomonas is connected with a form of diarrhœa.

I have been much perplexed as to whether trichomonas (Leuckart) was not present in some

of the cases. The undulating comb was certainly seen in many individuals, but was absent in others. Perhaps both species were mixed. The posterior end of most of the parasites was much more rounded than is represented by Lenckart and Blanchard, but the terminal filament was generally present, and was frequently employed in dragging about particles of loose matter. Conjugation was frequently seen. These parasites die quickly after evacuation. Fifty or more have been frequently found in the field of a $\frac{1}{4}$ inch glass. Case 5 is illustrative of the swarms of parasites which may infest people who are not careful of their drinking water in the tropics.

Addendum.—I should like to add a few lines closing my list of amœba and cercomonas cases up to date of my departure from Bangalore (29th March). Cases 8 and 9 were much improved under quinine and a morning 1-grain dose of thymol. In Case 10 the motions had become solid, and the cercomonads had vanished under a morning 10-grain dose of thymol but amœbæ still remained in some numbers; while on the 20th a specimen unexpectedly showed a few eggs of anchylostoma and trichocephalus, which had not been observed before in numerous specimens. Some of this motion was placed in sand and water with a view of rearing anchylostomæ; nothing was found on the 28th instant, but Mr. Appia writes that on the 31st the sediment contained numbers of large amœbæ, a point worth noting, though the amœbæ may have been ordinary fauna. The following additional cases have been found in a day or two.

Case 14.—M., aged 35. Diarrhœa and slight dysentery of recent origin. On 26th a few cercomonads in a nearly solid motion. On 28th a stool consisting of thick slime stained with blood. *Amœba coli* in considerable numbers and cercomonads very numerous; also clusters of bodies looking like dead cercomonads. Many cercomonads seen *dragging about red corpuscles*.

Case 15.—F. 35. Obstinate diarrhœa of recent origin. Very numerous cercomonads, which disappeared after injection of nitrate of silver, but were seen again in a day or two.

Case 16.—M., aged 15 months. Fever (continued) and diarrhœa; numerous cercomonads.

Case 17.—M., aged 6 years. Diarrhœa of recent origin. No emaciation. Numerous cercomonads; also clusters of bodies as in Case 14. Very numerous eggs of ascaris and trichocephalus; 14 of the latter in a cluster also numerous Charcot-Leyden crystals.

These crystals were also observed in previous cases of parasitism, and so far as I remember (I forgot to record them) in Cases 4 and 5. On the 29th instant Mr. Appia most unexpectedly found amœbæ and eggs of anchylostoma, ascaris and trichocephalus still present in Case 5, nearly 4 weeks after I thought that I had got rid of these parasites with ipecacuanha and thymol (which have been remitted for three weeks). *Filaria*

also are of course still in the blood, and the patient remains restless at night and anæmic. We may apply some such term as Herodiasis or Herodopathy to such cases!

SOME SUGGESTIONS AS TO THE TREATMENT & AFTER-TREATMENT OF CATARACT, DERIVED FROM AN EXPERIENCE OF 1,100 CASES.

BY SURGN.-CAPT. R. H. ELLIOT, I.M.S., M.B. B.S.,
LONDON, F.R.C.S.

DURING the thirteen months (July 1895 to August 1896) that the writer acted as Superintendent of the Government Ophthalmic Hospital, Madras (in the absence of Surgeon-Major T. H. Pope on leave), it fell to his lot to perform about 1,100 cataract extractions, 1,068 of the operations occurring in hospital practice.

The object of this paper is to state the views as to the treatment and after-treatment of cataract which this series of operations has led him to adopt.

With certain reservations to be hereinafter stated, the operation chosen was that which in the Madras Presidency is spoken of as Drake-Brockman's operation, after the name of that famous medical officer, who is still remembered throughout India.

By the courtesy of Surgeon-Major T. H. Pope the Superintendent of the Government Ophthalmic Hospital, the writer had many opportunities of seeing that officer perform Brockman's operations, before he himself had occasion to use it. Dr. Pope has recently published an interesting pamphlet entitled "Cataract in the Madras Presidency" (Publishers, Henry Frowde, Oxford University Press Warehouse, Amen Corner, E.C.), in which he clearly and fully describes the operation we have been speaking of.

As this pamphlet may be easily referred to, and has doubtless had wide circulation, it seems unnecessary here to repeat the details of the operation. It suffices to say that the main features of the procedure are that:—

- (1) Mydriasis is procured by atropine, and anæsthesia by cocaine.
- (2) Needling with Bowman's needle precedes the performance of the section.
- (3) The section is large.
- (4) Simple extraction is aimed at, if possible.

Each step of the above mentioned operation will now be discussed in turn, and when that has been done, it is proposed to review the various complications that assail the after-treatment of our cases.

In this paper the writer does not presume to be dogmatic, nor does he claim that his views have by any means reached finality. Surgeons may often be heard to say "that cataract extraction is a simple affair, and one can learn all about

it after an experience of a few cases." Such is not the writer's opinion, and he believes that; though many able pens have written on this theme, it will be long before some at least of the questions raised are finally settled.

ON THE CHOICE OF CASES FOR CATARACT EXTRACTION.

No eye should be submitted to an operation for the extraction of a cataract unless the organ and its accessory structures are in a healthy condition.

Catarrhal ophthalmia, granular ophthalmia, pterygium affections of the cornea and diseases of the lachrymal passages must be cured by suitable treatment before an extraction is attempted.

The presence of synechiæ, especially if extensive and resistant to atropine, is a serious complication which is very likely to adversely influence our results.

As a rule, it is unwise to operate if an iris shadow be present. But in long-standing slow-growing hard cataracts, especially when both eyes are affected, it is often unnecessary and inadvisable to wait for complete maturity.

The amount of perception of vision present in cases of mature cataract varies greatly. In the hard slow-forming variety, the patient may count fingers at a foot or more from his eye, while in a case of Morgagnian cataract, one is amply satisfied if the patient can distinguish the direction of hand movements in front of his eye. Between these limits a large number of intermediate degrees of visual power will be met with. At the upper limit of the scale, an occasional doubt will arise as to the maturity of the cataract, but this doubt can be easily laid to rest by the use of the ophthalmoscope. More difficulty will be experienced in deciding on the fitness or otherwise of those cases, which fall below the lower limit, that we have mentioned. From time to time one meets with patients whose visual powers are limited to the faintest perception of light and shadow. Indeed, one may have considerable difficulty in satisfying oneself that the retina is still functional.

It is then a nice question to decide how far the absence of vision is due to the presence of lenticular opacity, and how far to fundus changes in the eye.

In India, where the history of the case is usually vague or worse, our difficulties are considerably increased. In England a Surgeon often follows his case from start to finish, or at least he can obtain from an intelligent patient, or better still, from that patient's medical adviser, an account of the incidence of the symptoms. The Surgeon in the East, on the other hand, has but two factors to guide him in this particular class of cases, *viz.* :—

(1) The density of the opacity, and (2) the degree of vision left. The writer has made it a rule that so long as a comparison of these two

factors gives any hope of benefit to the patient's condition an operation should be done. It is needless to say that such cases do not give brilliant visual results, and that, in a percentage of them, one fails to improve sight at all. It may be urged that such operations, if they fail, damage the prestige of European surgery. Further, the call for statistics from Government medical officers, makes men disinclined to risk failure. The obvious moral is that each man must choose, as doubtless we have most of us chosen, between the interests of our patients and the appearance of our statistics. That surgery of the kind here advocated does really damage a Surgeon's reputation one may well refuse to believe; the native in these matters is "no fool," and he is not long in ascertaining whether the general run of a medical officer's cases are successful or not.

It must be clearly understood that the above remarks have no reference to cases of glaucoma. To extract a lens whose opacity is secondary to a glaucomatous condition of the eye is unsound. Even the cases which appear most tempting are sure to end in disappointment, if the Surgeon is rash enough to extract the lens. On the other hand, where high tension supervenes on a simple cataractous condition of the eye, and where the case is met with sufficiently early, extraction is obviously indicated, and often gives most brilliant results.

PREPARATION OF THE PATIENT: ANTISEPTIC PRECAUTIONS, &c.

When possible, it is certainly preferable to detain the patient in hospital for 48 hours previous to operation. On the day of admission, a dose of castor-oil is given, and the patient is enjoined to spend the two days as quietly as possible. On the night preceding operation the eyebrows are shaved, and the skin of the eyelids and surrounding parts is carefully washed with soap and carbolic lotion (1 in 40), the patient being told to keep the lids closed in order to prevent soap, &c., entering the conjunctival sac. This washing is repeated early on the morning of operation, and a pad of wool wrung out dry in saturated boracic lotion is kept applied to the eye until the patient is brought on the table. An hour before operation a few drops of homatropine solution (gr. viii ad ʒi) are instilled into the eye, this instillation being again repeated in half an hour's time if necessary. Before operation the conjunctival sac is gently washed out with boracic lotion dropped in from a dropper-bottle. Anæsthesia is obtained by using cocaine (4%) dissolved in boracic acid lotion, two or three instillations at five-minute intervals are quite sufficient.

The writer has abandoned the practice of cutting the eye-lashes, as he found that the irritation caused by the short stubby hairs sometimes led to a troublesome entropion of the lower lid. He considers that the theoretical advan-

tage gained does not balance the decided drawback just mentioned.

The procedure above advocated is to the writer's mind ideal. In dealing, however, with timid patients, who, if left a few hours in hospital before operation, are likely to take fright at the thought of the knife, and run away, one is often obliged to place them on the table at once, wash the skin, shave the eye-brow, instill the mydriatic and anæsthetic, and extract the cataract without further delay. The use of a perchloride medium for the cocaine, &c, has the disadvantage of irritating the conjunctiva and so delaying convalescence. This irritation is noticed even when a solution of only 1 in 10000 of perchloride is used. After a trial of the mercurial medium in several hundred cases, the writer has given it up in favour of a solution of boracic acid in freshly boiled water.

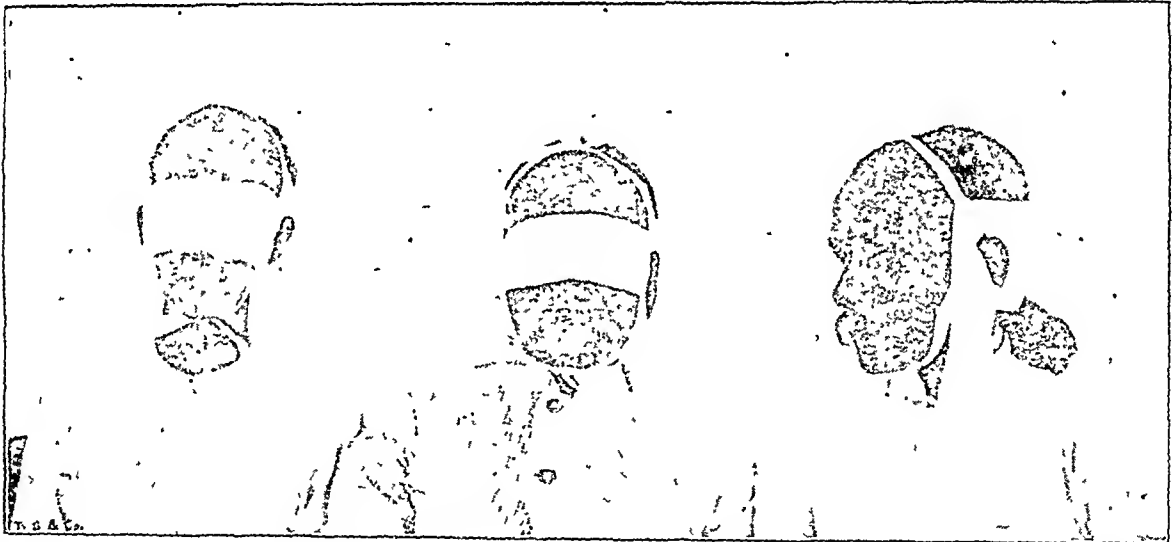
Homatropine is much to be preferred to atropine since its mydriatic effect passes off rapidly, and thus the danger of prolapse of the iris is minimised. In those cases, however, in which posterior synechiæ exist, atropine must of course be used.

that it cannot slide up or down. Each free end of the bandage is now slit into three tails from before backward to a point opposite the patient's temples; each centre tail is $2\frac{1}{2}$ inches broad, while the breadth of each of the four remaining tails is $\frac{3}{4}$ of an inch.

To apply the bandage, the ears are fitted through the holes made for them, and the two upper and two lower tails respectively are tied together, the one pair over the vertex and the other below the chin. The patient is brought on the table with the bandage thus applied. After operation one of the two broad tails is brought down across the dressings and held in position by an assistant, while the operation brings the remaining tail down on top of the previous one, and fixes the bandage by means of a pin applied at each side.

At each dressing the pins are removed, the two broad tails are thrown backward, and the dressings are changed. The eye is then closed by re-applying the middle tails in the same way as before.

By this contrivance we are able to repeatedly dress our patient without raising his head from



BANDAGE AND DRESSINGS.

The form of bandage, described below, was shewn to the writer by Dr. Woutersz of Ceylon. It is vastly preferable to any other cataract bandage that one has seen used either in England or India. It is made thus:—

A piece of bandage cloth is taken 4 inches broad, and of such a length that it will pass one-and-a-half times round the patient's head. The mid-point of the strip is placed over the patient's external occipital protuberance, and the two free ends are held in front by an assistant; the position of the two ears and the size of their bases are carefully measured on the bandage. This is now removed, and two holes are cut, one on each side, to fit the corresponding ears. The object of so doing is to fix the bandage so

the pillow, or in any other way disturbing him. Another advantage is that firm and graduated pressure can be very easily applied.

After operation, the eye is dressed in the following way:—A thick coat of finely powdered boracic acid is dusted on to the outer surface of the dry closed lids; over this is applied two folds of dry lint which has been previously soaked in a 1 in 5000 solution of perchloride of mercury. Great care is next taken to fill up the hollow of the orbit with absorbent aseptic wool. The opposite eye is closed in a similar manner; the bandage is then fastened as already described.

When it is considered desirable to release one eye, this is easily effected by omitting the dressings and cutting a window in the bandage opposite the eye in question.

- A—Shows the bandage as adjusted before the patient is brought on to the operating table.
- B—Shows one middle tail (the apparent right one) brought down over the dressings. The other tail is seen hanging down.
- C—Shows the bandage applied and secured by pins.

CLINICAL CLASSIFICATION OF CATARACT.

There have been so many attempts made to classify the various forms of cataract that perhaps an apology is needed for offering a classification which the writer has not hitherto seen. The following arrangement, however, is purely clinical, being intended as a guide for the operator, and dealing exclusively with mature cataract—

I. Hard cataract:—Clinical varieties:

- (a) Simple hard cataract.
- (b) Morgagnian cataract.
- (c) Hard cataract with cheesy degeneration of cortex.
- (d) Black cataract.

II. Cortico-nuclear cataract.

III. Soft cataract.

IV. Discoid cataract.

V. Traumatic cataract.

The simple hard cataract is one in which the consistence of the lens is nearly uniformly hard through its whole thickness. The colour of such lenses varies somewhat in different cases, and the centre generally is of a deeper tint than the cortical portion.

Of the *Morgagnian cataract* little need be said. Anyone who has had experience of a large number of consecutive cases of cataract must have noticed all degrees of this condition. In some the nucleus is so small as to hide behind the iris, when the section is opened, and so evade the ken of an unpractised observer; whilst in others a large nucleus is surrounded by the thinnest possible coating of fluid matter. The writer recently operated on a high caste Hindu who had been suffering from cataract for 17 years. The nucleus of the right cataract was so small as to escape observation. When operating on the left eye, the nucleus was very carefully looked for, and was found to be a tiny lamella about two millimetres in diameter and half a millimetre in thickness.

The *hard cataract with degenerative cortex* is a form to which special attention is here directed. It is commonly confused with a true cortico-nuclear cataract, but the writer believes this to be both a pathological and a clinical mistake. From the point of view of an operation, there is the greatest difference between the hard cheesy material of the cataract we are speaking of and the soft semi-fluid matter of the cortico-nuclear variety. The latter, if left in the chamber, will be speedily absorbed, and when in

moderate quantity will rarely, if ever, give trouble, while the former, if left behind, is more difficult to remove and much more dangerous. It absorbs aqueous, swells up, and takes a long time before it itself becomes absorbed. It further appears to irritate the iris, causing local synechiae and irregularity of the pupil. If we compare a large number of these cataracts with each other we are struck with the fact that we can trace all gradations from the most marked cataract with degenerative cortex up to the condition of an almost simple hard cataract, whereas we cannot trace any connecting link between these forms and the true cortico-nuclear cataract. The one variety is sharply and definitely marked off from the other by the physical characters both of the nucleus and of the cortex, as will be seen by a reference to the subjoined table:—

	Hard cataract with degenerative cortex.	True cortico-nuclear cataract.
Nucleus.	Hard, resembling a hard cataract, or the nucleus of a Morgagnian cataract.	Harder than the cortex, but easily squashed under light finger-pressure.
Cortex.	Cheesy—breaks off in flakes—expelled with difficulty if left in the chamber—swells up and irritates iris, if not removed.	Semi fluid—looks like a dense flocculent chemical precipitate, when seen outside the eye—easily expelled from the chamber by pressure. If left behind, is readily absorbed and causes little irritation.

If we compare these degenerative cataracts with Morgagnian cataracts, we find two features common to both, *viz.*:—

(1) A comparison of a large number of cases of either variety shows us the involution of the most marked form (be it the Morgagnian cataract or the cataract with degenerative cortex) from the typical hard cataract. In both cases we have to do probably with the secondary degeneration of the cortex of a hard cataract. In the one the cortex breaks down into fluid; in the other, the product of degeneration is a brittle, cheesy opaque material, and

(2) Both forms occur in elderly people.

Black cataract is uncommon. This is fortunate, as its association with deep-seated changes in the eye, renders the prognosis very unfavourable.

Cortico-nuclear cataract does not call for any special comment. The cortical matter has never been sclerosed; it is soft and flocculent, easily expressed and readily absorbed.

The term soft "cataract" is used in the ordinary text-book sense; nor has the writer anything special to say about the traumatic cataract.

Discoïd cataract.—From time to time one meets with a variety of cataract which might well be called capsular, but for the fact that this name is associated with a quite different variety of opacity in the minds of most ophthalmic Surgeons. The cases referred to usually give either a congenital history or a history of injury. The main body of the lens has been more or less completely absorbed, a thickened capsule, with possibly some unabsorbed remains being left. In this way a flat plate or disc is formed. The condition can be easily recognised by oblique illumination with the dilated pupil, and the disc can be readily removed with a pair of iridectomy forceps after first excising a portion of iris.

Sometimes the disc is so thin that it can be torn with two needles, an aperture in the visual axis being then obtained.

The name above suggested, while it involves no theory, aptly expresses the appearance of this variety of cataract.

DYSENTERY IN BENGAL JAILS.

BY SURGEN.-CAPT. W. J. BUCHANAN B.A., M.B., DIP. ST. MED.,
Superintendent, Central Jail, Buzar.

THERE is probably no subject which more exercises the mind of the medical officer of a jail than the prevention and treatment of dysentery. The following remarks are the result of several years' experience of it in several jails of Bengal. The first question to be settled is whether there exists more than one form of dysentery or not. As far as present experience goes, I consider there are three varieties of the disease, or rather three diseases or conditions, which are usually returned under the heading dysentery. Unless this is recognised, it is impossible to apprise correctly either the results of treatment, or the value of measures of sanitary prevention. For the present these three varieties are here provisionally called "mild," "acute," and "chronic," not a very original nor startling classification.

What then is here meant by the term "mild" dysentery? The patient (or prisoner rather as we are now considering the disease as met with in jails) seldom comes to hospital till he sees either mucus or blood or both in his stool. He will complain of straining and bearing down pain over the sigmoid flexure or sometimes in the hypogastric region. On inquiry it is often found that the attack was preceded by a somewhat copious semi-solid motion, though when first seen at hospital, the stools contained little or no feculent matter, often only rose-coloured mucus in quantity about two drachms. This stage continues for several days unless relieved by treatment. This mucus probably comes from the enlarged solitary glands of the large intestine in the neighbourhood of the sigmoid flexure. The condition is pathologically a catarrhal process, congestion, exudation, and rup-

ture of capillaries, but I cannot hold with the opinion that this complaint is to be called "intestinal catarrh," "colitis," or other such more comfortable name. Whether this disease is a separate entity or only a first stage of the acute form which has resolved before going on to ulceration is open to question, but that some cases apparently mild proceed to ulceration and even perforation the following case will show. A prisoner in Burdwan Jail was admitted to hospital in December 1896 for "intestinal catarrh," after suitable treatment apparent convalescence set in, and three weeks after coming to hospital he had even begun to gain in weight. All went well till he was suddenly attacked by acute pain in the abdomen, suggestive of acute dyspepsia, but which soon appeared to be due to peritonitis. The *post-mortem* examination showed a large irregular sloughing perforated ulcer of the sigmoid flexure with fecal extravasation and consequent peritonitis. The lower portion of the large intestine was a mass of irregular thick edged ulcers in all stages of ulceration and repair, while the small intestine was quite healthy and was loaded with fecal matter, as was the upper part of the colon.

I consider that all these cases of mild "dysentery" are correctly designated, and would restrict the term intestinal catarrh to affections of the small intestine. The majority, however, of such "mild" cases have no such history, they are usually cured by rest in bed and bland diet in a few days.

As regards causation these cases appear to be brought on by slight causes, chills due to vicissitudes of temperature, irregularities of diet, that is, either badly cooked or unsuitable food, eating raw grain (though this usually produces a form of watery diarrhoea), and in some cases the very excellence and abundance of our jail dietaries will produce this condition (*see below*). Such attacks are very liable to recur, also from slight causes. It is also probable that polluted or even muddy water will have the same effect. Some of these points will be referred to later on.

We now come to the second form of dysentery met with in jails, *viz.*, the acute. By this is meant the ordinary acute dysentery of the text-books. It is accompanied by tormina, tenesmus, prostration, fever, frequent and scanty stools. An attack lasts from 4 to 8 days, and is frequently fatal. In my (perhaps lucky) experience of the past two years at least I have found this acute form of dysentery to be much less common than the other varieties. In the Central Jail, Bhagalpur, during 1896 I met with only two such acute cases in a population averaging over 1,200, one was rapidly fatal and the other recovered. In these cases we find the regular "meat-washings" stools (*lotica carnea*) of the older writers.

(To be continued.)

A Mirror of Hospital Practice.

PRETERNATURAL (INVERTED) LABOUR— FOOT PRESENTATION—DELIVERY BY APPLICATION OF FORCEPS TO THE AF- TERCOMING HEAD.

BY B. SUBBA ROW, C.M.S.,

In medical charge, Civil Dispensary, Pamiidy.

THE following case, though it may not appear to be one of very great importance from an obstetric point of view, is still worthy of being recorded from the peculiar circumstances connected with it. It shows, without the least pretension at exaggeration, to what extent charlatans, quacks, self-styled doctors, &c., are capable of committing immense mischief on the gullible public, who, besides filling the coffers of these barefaced liars, are very often blind to their own folly in entrusting their precious lives to the care of such base impostors. I have often seen many a respectable practitioner, who has devoted years of his life for understanding and treating the diseases which the human flesh is heir to, almost starve to death for want of due appreciation of his skill and professional capabilities.

I am afraid I am intruding too much upon your valuable space, so without enlarging on this point I come to the case in question direct.

On the morning of the 29th November 1896, a Hindu male, Ommurappa by name, came to my dispensary and said (to use his own words which when rendered into English run thus)—“Sir, my wife is in labour, the legs and half the body of the child are out, the woman is in great agony; I have engaged the services of a midwife, who has directed me to go to you and procure some medicine for fainting.”

On further questioning he told me that the midwife had undertaken to deliver the woman (would any of your readers believe) by the strange and abominable process of placing the woman under the deep influence of a narcotic, and then dragging out the child by brute force!!! The result of such a procedure, if allowed to go on, needs no further comment at my hands than the mere mention of it; my professional brethren can easily take in the situation at a glance. However, as the man was an ignorant and illiterate villager with little or no idea of “parturition,” I explained to him the dangers that might arise consequent on such a hazardous and barbarous practice, and consented to deliver the woman with the aid of instruments, provided he had no objection to my doing so.

On arriving at the house I saw the patient on a rickety couch reclining against a plank of wood kept there for the purpose, with the midwife by

the side of her head (a most suitable position indeed for a midwife); the room, though it could not conveniently accommodate a dozen persons, was actually crowded with 40 odd women—old and young, relatives, friends and acquaintances—gossiping as to the line of action to be followed. Without wasting time I had the women driven out, “the midwife” (!) first and foremost among them, and ordered the patient to lie down and to make herself comfortable.

On examination, I found that the case was one of footling presentation, the trunk born already, the child's head arrested at the brim and compressing the cord; the front of the mother looking towards the abdomen of the mother. On auscultation, the heart sounds of the child were inaudible; other signs also pointed clearly to death of the child long before my arrival at the house.

On enquiry, I found that she had been four days in labour and the trunk had been born more than two or three hours before I saw her. In spite of the fact that the dispensary is located within 50 yards of the house where this case occurred, they did not think it necessary to request me to see the patient until all the tugging and pulling of the trunk by the old women were of no avail.

So there being no hope of the child as the last spark of life had already been extinguished, my only procedure was to effect delivery without danger to the mother. To be on the safe side, however, I drew the cord gently down so as to prevent dragging on the navel. The trunk was then carried well forwards towards the abdomen of the mother, and I ordered my assistant to hold it there. Then I passed my hand into the vagina, placing the fingers under the head between it and the cervix. Afterwards, of course, I introduced the blades of the forceps in order and locked, and the head was drawn into the pelvic cavity in the axis of the brim. When the head entered the pelvis, the blades were removed and delivery finished with the hands.

The woman recovered in due course of time without any complications worth recording.

Remarks.—Several cases of a kindred nature have come under my notice in which the credulous public have been practised upon in innumerable ways, unworthy of a respectable practitioner. In sending this case to the columns of your journal, I earnestly request all your readers and professional brethren to bring to light similar cases that may come under their observation in their practice, so that there may be a permanent and faithful record of the endless barbarities and inhuman procedures to which the public are, times without number, subjected in the name of the noble “healing fat,” in different parts of this vast Empire.

THE STANDARD.

A Scottish Life Office of 70 years' standing, and one of the wealthiest and most progressive of the Provident Institutions of the United Kingdom.

DOUGLAS STEWART,

Secretary,

Standard Buildings, Dalhousie Square,

CALCUTTA.

Indian Medical Gazette.

MAY, 1897.

MEDICAL REGISTRATION.

AFTER a patient silence of years we return to the important question of the necessity for a *Registration Act* for India, an *Act* which might be and ought to be introduced without delay into all large towns, and which, after a fair trial, could be extended to provincial areas. We do not ask for any hasty or ill-considered laws, for the matter has already received grave, and in our opinion satisfactory, attention at the hands of the medical profession. If, however, the Government is not satisfied with the evidence before it, surely it would be possible to appoint an intelligent Committee to sift the evidence already collected, to examine witnesses and to frame draft rules which could be subsequently shaped into an *Act*. The importance of this subject was recognised years ago, and in 1881 the medical profession in Bombay drew attention to their desire to have a *Medical Registration Act* for the town and island of Bombay. Their wishes were, in our opinion, on fallacious grounds entirely disregarded, but the Grant College Medical Society attacked the question again in 1887. The Calcutta Medical Society stimulated by the activity of the sister Society discussed the question at a meeting held on July 13th, 1887, and continued the discussion at subsequent meetings. A paper was read by Dr. Birch which gave a most exhaustive review of the situation, and left no doubt in the minds of the majority that a very serious evil existed which could only be dealt with by legislation. It was pointed out that nothing existed to prevent the formation of so-called medical schools which pretend to teach medicine "without dissecting room, library, museum, hospital, diagrams or appliances." This statement, now ten years old, is

true to-day, and is confirmed by the existence of such extraordinary institutions with high-sounding titles making a profit out of what can only be termed 'bogus' diplomas. There can be no doubt whatever that the medical profession, and we speak of both European and Native medical men, has a right to demand some protection against unqualified and ignorant men who bring disgrace upon the science and art of medicine and surgery. In dealing with this question some consideration would have to be shown to the large number of unqualified practitioners, kobirajes, baidas and hakims, at present plying their trade. They should, however, all be registered, and, after the passing of the *Medical Act*, new additions to their ranks would not be permitted. We need not stop to discuss whether there is any need for the existence of such persons. There is certainly no need for them in the large towns to which this *Act* would first apply. Medical aid of a respectable and fairly reliable kind is now available in all large towns throughout India, and for the very poor there is always a hospital at which free medical attendance can be obtained. Surgeon-Colonel Ross in his *Triennial Report on Charitable Dispensaries* has called attention to the fact that "anyone with a smattering of medical knowledge and even without it, can and does set up as a private practitioner" in Bengal; and further that "there is actually a so-called medical school in Calcutta which grants medical diplomas although it has no charter, and is not even affiliated to the University or to any recognised medical institution."

There are two interests at stake, both worthy of careful consideration. The interests of properly qualified medical men cannot be lightly passed over. When aspirants for medical qualifications learn that, after all their expenditure of time and money, they are on the same footing as the merest quack, their reflections are not likely to encourage others to follow in their footsteps. It is notorious that, so far as Government medical institutions are concerned, the supply of really good men is never equal to the demand. In the interests of the general welfare of the public the Government has a duty to perform and that duty is to give every one who is anxious and willing the means not only of obtaining a proper medical education, but also the means of earning an honest living, by protection against competition with ignorant and dangerous unqualified prac-

tioners. The question affects not only Natives and Europeans who have studied in India but also all European medical men who have come out from England and set up in practice in our large towns, and to a less degree all military medical officers whose appointments permit them to engage in private practice. It has been objected that the passing of a *Medical Registration Act* will not put a stop to 'quackery,' nor will it prevent a certain minority of qualified men from engaging in disgraceful forms of practice. It would be futile to argue that any such perfect results would ensue. Punishment of offenders would, however, become easier and more certain. That these results follow the passing of such an Act may be gathered by anyone who will take the trouble to read the proceedings of the Medical Council in England, which are regularly published in the English medical journals. The question next requires consideration from the point of view of the general public. We think that no one will deny that the general public should be protected, as far as possible, from the dangers which accompany the existence of ignorant practitioners of medicine, and the only way to do this is to set forth clearly the diplomas and degrees which carry with them some guarantee that the possessor has been educated in a reliable school of medicine or University.

We have not space to recapitulate the details of the various discussions held upon the question of Medical Registration, but interested readers will find full information in the volumes of the *Indian Medical Gazette*, especially in the volume for 1887. We would suggest to the Medical Societies in the large cities of India and to the Indian branches of the British Medical Association the desirability of again raising this question with the view of obtaining a Commission of Enquiry, by whose opinion the Government might be guided as to the necessity for action, and the course to be adopted.

THE PRESIDENCY GENERAL HOSPITAL OF CALCUTTA.

In a former article we referred to the report of the Committee appointed to consider and report on the structural requirements of the Presidency General Hospital, and to the resolution of the Bengal Government which accepted the recommendation of the Committee with

very slight modifications. The chief recommendations were: *firstly*, the acquisition of a plot of land on the east of the present hospital, now the site of one of the worst bustees in Calcutta, in order to provide space for new buildings. We are glad to observe that this has been already carried out; and, *secondly*, the construction of a hospital consisting of separate blocks for paying patients, for women and children, for adult male patients, for infectious cases, for lying-in-patients, and the necessary administrative buildings, all to be such as modern science shows to be necessary to a fully equipped hospital. A further advance has been made in the appointment of a Committee to inquire into the administrative arrangements of the hospital. The resolution of the Government of Bengal on the subject states that, from time to time, complaints have been made regarding the arrangements at the General Hospital, more especially in regard to delay in the admission of patients, occasional absence of Resident Surgeons, insufficient medical and nursing staff, the quality and preparation of food, unsuitableness and inadequacy of clothing, bedding and linen, deficiency in the supply of modern appliances in the operating room, and the short time of attendance of the Superintendent of the Hospital. The Committee is to inquire how far these allegations are well-founded, and to determine what changes in the system of management should be introduced at once, and what further changes will be necessary when the new buildings come into use. The Committee is one which will inspire public confidence and consists of—

Surgeon-Lieutenant-Col. Bomford, Principal, Medical College, *President*.

Allan Arthur, Esq., President, Chamber of Commerce.
Surgeon-Lieutenant-Colonel Lewtas, Officiating Professor of Anatomy, Medical College.

Surgeon-Lieutenant-Colonel Cobb, Officiating Superintendent, Presidency General Hospital.

Mrs. Ashton, Honorary Secretary, Ladies' Committee of the Canning Home, and Calcutta Hospital Nurses' Institution.

Surgeon-Captain Moir, Officiating First Resident Surgeon, General Hospital, *Secretary*.

Much has recently been done to improve the arrangements of the hospital, but there can be little doubt that there are still many reforms urgently called for which admit of introduction, apart from structural changes. The Presidency General Hospital is the most important European Hospital in this part of India drawing its

Patients from a large area from all classes of the European and Eurasian communities, and all its arrangements and appointments should be of the best. An increase to the medical staff and re-arrangements of their duties seem desirable. There can be no doubt that the subordinate medical staff is undermanned, and in consequence the Assistant Surgeons are at times greatly over-worked to the detriment of their health and the proper performance of their duties.

Too much also is expected of the Resident Surgeons, who, in addition to their hospital duty, are engaged in other important work. Their energies have largely to be directed to the Asylum and Jail. The First Resident Surgeon is in executive and medical charge of the European and Native Asylums at Bhowanipore and Dullunda. Both of these institutions are very important charges, and demand much time and attention on the part of the medical officer. The 2nd Resident Surgeon is the medical officer of the Presidency Jail, containing between 1,200 and 1,300 prisoners, which of itself is a very responsible and onerous position. If these officers were relieved of outside duties, and thus enabled to devote their whole time to the work of the hospital, they would be in a similar position to the resident medical officers of other large hospitals, and in consequence many sources of complaint would be removed, especially that with reference to the absence of medical officers, and consequently delay in attendance on newly-admitted patients. The existing arrangements might at any time lead to a grave scandal.

As with the medical staff so with other departments, the tendency is to place too many duties on one man. For instance, there is no Steward for the hospital, the work being performed by an Assistant Surgeon, who is the Personal Assistant of the Superintendent and whose duties as Personal Assistant are sufficient to keep him well employed without attempting those essentially belonging to that of a Steward, such as arranging for supplies, the superintendence of cooking, &c., which do not necessarily require to be carried out by a medical man. We observe in the report of the Committee on Calcutta Hospitals appointed in 1878, of which Mr. J. O'Kinealy was President, that one of the recommendations to improve the administration of the General Hospital was the appointment of a Steward. We think that if this recommendation had been

carried out there would have been no cause of complaint with regard to the food and cooking.

In a previous article we referred to the deficiencies in the nursing arrangements of the Calcutta Hospitals, indicating at the time the direction in which improvements ought to be made. These recommendations advocated the selection of well qualified nurses, under the superintendence of a trained Lady Superintendent, and trained Sisters in substitution of the present unsatisfactory system.

Medical News.

PROFESSOR HAFKINE.

THE Government of India have granted Professor Haffkine an allowance of Rs. 2,000 per month, to have retrospective effect from the date on which he commenced his researches on Plague in Bombay. We congratulate Professor Haffkine on this recognition of his valuable services, and at the same time we appreciate the encouragement which the Government of India has thus given to scientific research. The work which Professor Haffkine is now engaged in in Bombay is of vast importance not only to the Presidency of Bombay but to every place wherever plague may spread. The most recent information is highly encouraging, and the numbers that apply to be inoculated shows that the system is gaining ground in the confidence of the people. The symptoms produced by the prophylactic serum are mild, which, no doubt, is an important factor in bringing large numbers to the inoculators.

LONDON CLUB FOR THE INDIAN MEDICAL SERVICE.

SOME time ago it was proposed that an Indian Medical Service Club should be started in London. It was found, however, that the numbers in the service would hardly warrant the establishment and maintenance of a London club on the scale of the other services. As an alternative, it was suggested that club-rooms for the use of the members of the Indian Medical Service should be obtained at the Imperial Institute. We hear that some 200 names have been enrolled, and there seems every prospect of the project being carried out. Members on joining become Fellows of the Imperial Institute, and thus enjoy all the privileges connected with the Institute. The scheme is an excellent one, inasmuch as it brings the members of a widely scattered service together and forms for them a centre at which, in addition to the social attractions, many important questions regarding the welfare of the service can be discussed and settled.

tit;

THE PLAGUE.

ar We are glad to note the steady decline in the prevalence of plague in Western India. This subsidence coincides with what has been noticed in epidemics in other parts of the world, when the temperature and dryness of the air reaches a certain point. It must not be forgotten, however, that plague is a disease which clings very persistently to a locality when once introduced; and after a period of prevalence and decline is apt to reappear when the climatic and sanitary conditions are favourable. There is no reason to suppose that the disease will behave differently in Western India than what it does elsewhere, and it is therefore incumbent on the authorities to in no way relax either their watchfulness or any of the preventive measures which they have recently introduced.

SUSPICIOUS CASES OF FEVER WITH BUBOES AT SINGAPORE.

It appears that in January last a large number of cases of fever with glandular swelling, many of which were fatal, occurred at Singapore. No satisfactory diagnosis appears to have been made. Active measures, however, for the segregation of the sick, and the disinfection of infected houses, were carried out, with the satisfactory result that the commencing epidemic was stamped out. As the local authorities, while acknowledging that the cases were suspicious, appear to have been unable to come definitely to a conclusion as to the nature of the disease, it is interesting to note that the Hongkong authorities report that undoubted cases of plague were brought to Hongkong from Singapore.

INDIAN MEDICAL SERVICE DINNER IN LONDON.

THERE is to be an Indian Medical Service Dinner in London on the 20th May. Sir Joseph Fayrer, Bart., will preside. The guests will be Lord Lister, Presidents of the Colleges of Physicians and Surgeons, Editor of the *Lancet*, and Dawson Williams, of the *British Medical Journal*; also the Director-General of the Army Medical Staff.

PLAGUE IN MARSEILLES IN 1720.

THE following account which we reproduce from the *Indian Lancet* of the manner in which plague was permitted to become epidemic in Marseilles in 1720 is of special interest at the present time:—

Captain Chateau, of Marseilles, left Sidon and touched at the port of Tripoli, in Syria, where he was obliged to take up some Turkish passengers for the Island of Cyprus. These per-

sons had clean bills of health, although the plague was raging in that quarter; one of the Turks was taken ill aboard ship and died in a few days, when his body, along with its effects, was thrown into the sea. Two sailors who had handled the cadaver were next attacked by the same symptoms, and also died; then two of their comrades and the ship doctor, who had treated them, perished. Three more sailors fell ill on the passage and died at Livourne. Physicians united in saying that it was malignant pestilential fever. Finally, the captain entered the port of Marseilles on May 25, and his vessel was not quarantined; ten days after another sailor died. On May 30, three other ships arrived in port from the same parts, and on June 12 another ship; all stated that there were suspicions of the plague at parts they had touched; nevertheless, no sanitary precautions were taken by the authorities other than to put the merchandise in warehouses, and soon several more people died. Captain Chateau, with all his family, now fell victims to the malady; it was finally decided to quarantine the four vessels. Three porters engaged to purify the merchandise died with axillary buboes. The hospital port surgeon obstinately refused to declare the disease contagious; two other city doctors were called in consultation and declared that the porters had died of plague. The passengers of the vessels were allowed to enter the town after nineteen days' quarantine, after their effects had been fumigated.

Dr. Peysronnel, father and son, had warned the authorities as to the contagious character of the disease, but the latter, fearing to excite the populace, took no measures to prevent the spread of the pestilence. Soon many quarters of the city were infected. Dr. Siard observed several persons attacked by buboes and carbuncles; they died in a night; other patients appeared, and this physician convinced it was the plague, formally notified the magistrates of the town. The latter, in place of appointing this clear-headed practitioner to make a report, named a surgeon to visit the sick; he, through utter ignorance or mean jealousy, declared the affection to be worm fever, simple in type and not contagious. After this other physicians held their tongues so as not to expose their *confrères* to mortification; then the contagion made frightful progress. On July 23rd, fourteen persons died in Escale Street alone, and many were attacked who died the following day.

This state of affairs caused a reign of terror in the city. Dr. Peysronnel, the son, now openly published the fact that the plague was epidemic. The Parliament at Aix issued an order declaring that all communication with Marseilles should be cut off; very soon the disease commenced to be felt, and to remedy this three stations were established in roads from Aubagne and Aix, and at Estagne by

way of the sea. Sellers were separated from buyers by barriers, and thus provided subsistence for the inhabitants. Four physicians, two surgeons and one apothecary were named by towns to visit and care for the sick, and all declared it was the plague that raged. But the public officials would take no heed of this information, and published quite the contrary news, despite the formal protests of Drs Perrin and Croizet. One physician proposed to light bonfires every day at 5 o'clock in the evening for three days on all streets and public places, and follow this up by burning sulphur in all the houses. This advice was followed; the air, thickened by a black burning smoke, increased the heat of the season, and contagion only grew more active. All the inhabitants deserted their houses, going to the country, camping out, or living aboard ships; all the public officers and nuns left the city, where only the clergy remained, animated by the example of the Bishop, the noble Monsignor De Belzunces, who exhibited heroic courage and a charity far above common engorgement. Measures were taken for the safety of the city and the furnishing of food. The common beggars and street vagabonds were obliged by force to remove the dead from houses and bury them. All functions—public, private commercial, religious and judicial—were suspended, yet disorder of all kinds was overcome, especially thieving and libelousness.

The greatest disaster wrought by the plague occurred in August. Drs. Chicoyneau and Vernet, of the Faculty of Montpellier were sent by the Government to recognise the character of the disease; with a strange degree of contempt, they declared it was only a contagious pestilential fever, and the celebrated Chirac, first physician to the Regency, confirming this opinion, sent rules and regulations to Paris as to how this deplorable condition of affairs was to be managed. Nevertheless, the two first medical experts left Aix very suddenly.

It would be too long and painful a task to retace the whole frightful picture that the city of Marseilles presented—streets and public places strewn with sick and dying and bodies thrown out into the by-ways exhalating a horrible odour. In the month of September a thousand persons died every day. The bodies served to feed homeless dogs.

The estimable Dr. Bertrand, author of this history, fell a victim to his zeal in caring for the plague-stricken sick; he was attacked no less than three times by the disease, but fortunately always recovered. Many physicians succumbed to the malady; twenty-five doctors and almost all the druggists perished. More than eighty convicts, forced to remove and bury the dead, died in eight days. Almost all pregnant women fell before the destroyer, either aborting or from want of care during confinement. The plague was no less severe in the

country, for it carried off five-sixths of the inhabitants in many small places. The disease gradually lessened in its intensity during the winter, and totally disappeared by the end of May, 1721. It was propagated in towns and their suburbs, especially at Aix and Toulon where it was carried through means of contraband merchandise. D'Autrechaux has printed a narrative of this. It ceased outside in the month of August, 1721. The mortality caused by this plague in Provence alone from July, 1720, up to August, 1721, was 84,719.

Dr. Bertrand distinguished two varieties of the malady, one benign, the other malignant. The first type was characterized by a slight chill at the start, pain in the epigastrium, nausea, vomiting, headaches, vertigo, more or less acute fever, that ended at the end of sixth day by sweating, or a fetid bilious diarrhoea, without any eruption of buboes or any other exanthemata; in some cases buboes appeared at the time of the invasion of the malady, or fifteen or twenty days afterwards, but these buboes passed to a happy termination by suppuration, or were dissipated by insensible resolution without being accompanied by other accidents. *This benign variety was very common.*

MEDICAL EXAMINATION AT KHANA.

From H. H. RISLEY, Esq., Secretary to the Government of Bengal—To the SANITARY COMMISSIONER, Bengal—No. 18 T.-M. Medical, dated Darjeeling, the 18th April, 1897.

SIR.—Complaints have reached the Lieutenant-Governor from various sources that in carrying out the provisions of Plague Notification No. 2, dated the 10th February 1897, prescribing certain regulations for the inspection of persons travelling by railway, a sufficiently liberal interpretation is not placed on Regulation 7, which requires that in conducting the medical inspection of females the medical officer shall, as far as possible, have regard to the customs of the country. It is also alleged that the huts provided for persons, detained under observation, afford inadequate protection from the hot weather sun.

2. The Lieutenant-Governor has carefully considered the whole question in consultation with the Medical Board, and has decided that the inspection, and, if necessary, the medical examination, of female passengers, whether European or native, travelling in carriages of whatever class, which are constructed on the saloon model, and afford ample space, shall be conducted in the carriage. If the compartment is overcrowded with passengers or encumbered with much baggage, it will be in the discretion of the lady doctor to order some or all of the passengers to vacate the compartment, and stand within a kanat enclosure on the platform.

Females travelling in ordinary intermediate third-class compartments must get out on the platform and undergo inspection within a screen of kanats, which should be invariably used.

4. In any case only inspection should, as at present, take place on the platform. Whenever examination, as distinguished from mere inspection, is required for female passengers of whatever class, it must be conducted in the carriage, and in all cases with closed doors. The lady doctor should have a sufficient supply of clinical thermometers to enable her to take the temperature of several females at once, if necessary, in order to ensure the completeness of her examination in the carriages. As the number of females is relatively very small, and the lady doctor has usually finished her examination long before that of the male passengers, there is no reason to suppose that the efficiency of the examination will be in any way affected. In so far as it is based on observations of temperature it will, in fact, be more rather than less thorough.

5. I am to request that you will be so good as to issue the necessary orders accordingly.

6. I am to add that the huts in the observation camp at Khana, which at present are roofed with mats and a single layer of tiles, should now be roofed with thick thatch laid on the top of the tiles. An attempt should also be made to protect the side walls, as far as possible, from the evening sun.

I have the honour to be,

SIR,

Your most obedient servant,

H. H. RISLEY,

Secy. to the Govt. of Bengal.

LONDON LETTER.

THE subject of the excessive prevalence of venereal disease, especially of syphilis, in the European army of India, continues to engage public and professional attention. A Departmental Committee was appointed in November last, by the Secretary of State for India, under Lord Onslow to report on the case. The facts set forth by this Committee have brought into view the magnitude and seriousness of the matter. "Venereal disease," the report states, "directly caused more than one-third of the total amount of sickness in 1895, 15 deaths and 348 invalidings, resulting in 130 cases in final discharge from the service; the constant and total disablement of 3,200 men out of a force of 71,000 men, and a vast amount of partial disablement and unsuitness for any but routine duties. Indirectly, it increased the amount of sickness and invaliding under the head of many other complaints.

The military efficiency of the army was most seriously impaired, and the increasing prevalence and intensity of contagious and inheritable disease among a body of 71,000 men, of whom many thousands are annually coming home to mingle with the civil population, was a growing danger to the health of the community. The Committee paid a visit to Netley Hospital, and found there a number of young men, disfigured, mutilated and incapacitated for life, whose terrible condition they describe in vivid terms. The Army Sanitary Commission has hitherto declared that the regulations issued and measures adopted under the Contagious Diseases Act in India exercised no repressive effect on the prevalence of venereal diseases in the European army of India. The rapid and great increase of these maladies—especially of syphilis—since the discontinuance of these measures has convinced the Commission that they did cause a restraining influence, the increase arising during their continuance being due to other circumstances, such as the greater youth of the soldiers and the lower proportion of married men. The Commission has, therefore, strongly recommended resort to preventive arrangements. The Colleges of Physicians and Surgeons and the medical press, together with the more influential organs of the lay press have, with strong and open voice, spoken to the same purpose, and numerous organizations are being formed to promote this movement; opposition is not wanting nor latent. Various individuals and associations are up in arms, and loudly remonstrate against the adoption of measures of any sort to repress these diseases as being wrong in principle and, as experience has shown, futile in action. These views, which are not altogether the ravings of hysterical faddists, but also the convictions of earnest good men and women, are entitled to every respect; but a comparison with the case of our own army and that of continental armies demonstrates beyond doubt that repressive measures are efficient, and that the liberty to spread loathsome and dangerous disease, can be, as it undoubtedly ought to be, restrained. The opponents of repression rely too much upon figures which, as is well known, can be variously interpreted and used with plausibility to support opposite positions. The interpretation of these figures constitutes the foundation of much of the controversial writing which appears in the press; but, except as a measure and index of the large amount of disabling disease due to sexual vice, they are of not much administrative value. These totals are made up of a great number of sub-totals representing the state of particular places and bodies of men, and these sub-totals vary much in any one year or series of years, and also from year to year. It requires a special investigation and study of these variations and their causes to understand the case properly. This special inquiry has never been

properly made, and it is not clearly known what degree of protection was really conferred by the preventive measures formerly in use according as they were carried out under favourable circumstances and efficiently or otherwise. At the first outcome of all this agitation the Secretary of State for India has sent to the Indian Government an important despatch in which the facts as regards the evils caused by venereal diseases in the army are forcibly stated, and instructions are conveyed that these maladies are to be treated as contagious diseases, the subjects of which, whether men or women, are to be subjected for purposes of segregation and treatment until they cease to be dangerous. The matter is to be worked on the principle of notification of infectious disease, and the manner in which this principle is to be reduced to practice, which must depend on the conditions of the country and place, is left largely to Military and Civil authorities in India, acting under the guidance of the general indications laid down by the Secretary of State. I gather from a telegram published in this morning's *Times* that there is a feeling in India, that the action taken by the Secretary of State is timid and inadequate. It may fall short of the requirements of the case looked at from a strictly hygienic point of view, but there are other considerations which a statesman has to take into account, and I am inclined to think that it was wise to proceed cautiously and tentatively in the matter, and that in so delicate a subject as this is, precipitate and extreme proceedings would probably defeat their own object. Let us hope that the Government of India will be enabled by the present sanction to enact laws and rules which will materially reduce the suffering and disablement caused by these affections.

The Indian Medical Service is to hold its first dinner in London on the 20th of May. The movement has long been mooted; but until this year no opportunity has been offered to members of the service retired and on leave of meeting together socially and spending a pleasant evening in each other's company.

Other services and interests assemble annually in this manner, and the wonder is that the Indian Medical Service has not long ere now instituted a function so popular and useful in this country. A great many men have already signified their intention of joining in the excellent project, and the Indian Medical Service Dinner of 1897 promises to be an unqualified success; and will, I hope, be the commencement of one unbroken series. Sir Joseph Fayrer, *Bart.*, is to preside.

The second volume of Dr. Clifford Allbutt's *System of Medicine* has just made its appearance. It contains abundant material which ought to be of interest and use to Indian medical practitioners. The articles appear to me to be well written and quite up to date. I am surprised that

the *Indian Medical Gazette* has not presented its readers with a review of the first volume which appeared some time ago. The work will take its place as a worthy successor to the late Sir Russell Reynolds' system which in its day had a great reputation and sale. Medical science advances rapidly in these days, and it has been found necessary to append to the present volume important information regarding typhoid fever, plague and yellow fever, which has accrued since the publication of the first volume.

9th April 1897.

Transactions of Medical Societies.

THE BOMBAY MEDICAL AND PHYSICAL SOCIETY.

THE adjourned Meeting of the Society for the discussion of the papers read on 5th March, was held in the Durbar Room, Town Hall, at 4-30 P.M., on Friday, March 19th. Brig.-Surgn.-Lieut.-Col. ARNOTT in the chair.

THE PRESIDENT having opened the proceedings—

Surgn.-Capt. PRALL objected to the name "Bubonic Fever," because many cases had no buboes.

Brig.-Surgn.-Lieut.-Col. BARKER thought the expression "Bubonic Fever" a good one, inasmuch as it declared the feature which is most frequently present, and which has in all history of the plague, ancient and modern, been regarded as a characteristic symptom.

DR. ISMAIL JAN MAHOMED spoke as follows:—

Mr. President,—No doubt Dr. Weir deserves our thanks for his paper, but I am sorry to say I disagree with most of the views expressed in his paper, while I am glad to say I agree with most of the views of Dr. Grayfoot. I am glad Dr. Prall has raised a protest against the disease being called Bubonic Fever. If Dr. Weir were here this afternoon, I would have thanked him to inform me if he used the term Bubonic Fever as a synonym of plague, or to denote a distinct disease of a milder nature and of a different type than the plague. If he uses the term as a synonym of plague it is a misnomer. By calling it Bubonic Fever, as our Health Officer calls it, thereby conveying an impression of a milder sort of disease with a different history altogether, a great deal of harm may be caused, as in the present case. For, by calling it by the simple name of Bubonic Fever he has lost sight of measures capable of grappling with the disease.

Dr. Weir gives abnormal rainfall as a cause of the disease, but this is not the only year in which there was such an abnormal rainfall. There have been many previous years in which the rainfall was abnormal to a certain extent though not to such an extreme.

Then he refers to the obstruction in the main drain and want of good drains. I would thank him to inform me if the collection of 4,200 cart-loads of silt consisting of putrifying organic and animal matter, which was blocked up for about twenty-five years in the Clive Road drains without a single ventilating shaft for about half a mile, was not a fruitful soil for the development of the disease.

Then our Health Officer refers to the grain theory, wet grain stored up in dark and damp godowns. I have examined all the godowns in Mandvie, and I say that they are well ventilated and dry godowns. They were not at all full when the plague commenced in the middle of August, but began to be full in the middle of September. If the grain theory was correct, plague should have occurred at Bhusawal, Sholapur and Barsi, where are great stores of grain, and it should not have occurred in Hongkong and other places which are not store-places of grain.

Sub-soil water may, perhaps to some extent, be one of the causes of bad health of the city. I should like to know as to whether in preparing the chart the Health Officer had calculated the percentage of mortality on the reduced amount of population or on the census population; and whether he has taken into consideration that all the cases of plague were not registered as plague. If he has taken these points into consideration, then the chart becomes a valuable one, otherwise it is not very useful.

The very first case of plague that came under my notice was in a house in Broach Street. The house was in a filthy condition, and the drains used to overflow on the road, for which Mr. Dharsee Nanjee corresponded with the Health Officer from March 1895 to August 1896, without the defect being attended to. This case had all the symptoms of pneumonia, rusty sputum, &c., and the case ended fatally. This case had no enlarged gland, and it was taken as a case of pneumonia. Another case of a Mooltanee occurred in the same house with similar symptoms and ended fatally. In this case there was slight enlargement of inguinal gland. I had another case in another house with enlargement of inguinal gland. My suspicions were aroused and I spoke to Dr. Weir about it, and he said they might be cases of diphtheria: this fact he acknowledges in his paper. After this I had several cases, and I was making observations when Dr. Viegas brought out the matter on the 11th September. Since then I agree with Dr. Grayfoot, that we have done nothing to check the disease till lately. Dr. Grayfoot thinks that the disease may have been imported. If so, there are many other parts nearer Hongkong than Bombay, and these ports are in more intricate communication than Bombay, and these ports should have got the disease earlier than Bombay. My idea is that the bacillus existed in a passive form till the time it found conditions fit for its development, namely, the accumulation of filth consisting of night-soil and urine and other organic matter in the drains for about twenty-five years.

I believe plague is transmitted more by human agency than anything else, and the phenomena of the death of rats is not present in every case. At Versova rats began to die after the first case was imported and died there.

DR. EDALJI NASHIRVANJI said:—

From what I have observed, I am inclined to believe that the occurrence and spread of plague in the Fort was probably due to the drains along the Frere Road being opened before the outbreak, in several places at short distances extending from near the European General Hospital to the Bazar near the Mint, and kept open for a number of days with fire burning near each opening. This procedure had, I believe, the effect of giving the gases of the drain an easy vent out into the open air. In the course of a week or so, cases of plague began to occur, first along and along the Frere Road, then about Mody Street, Bazar Gate Street, into cross narrow lanes, as the Fort Hanuman Street, &c., and the poison thus drifted by wind, entered into some houses situated in Hornby Road, but facing towards their back aspect the infected lanes. Before the drains were opened there were very few and isolated cases in the Fort, but about a week after they were left open a rapid outbreak and spread of the disease occurred, as I have said. The drains were then closed. Some time after, the drain at the northern end of Mint Road was opened in one or two places only, and soon a case of plague occurred in a Bhattacharya youth residing close to where the drain was opened. In whichever street or lane the disease extended, it showed a preference for filthy, dark and ill-ventilated houses, from which it also spread to cleaner houses. Dead rats occurred in some of the houses before the disease attacked human beings. Two or three dead rats were observed in my office in Hornby Road, and about six or seven in the house adjoining, and to the north of the Fire Brigade Station. I took the precaution of disinfecting my office by sprinkling twice in the day every room with carbolic acid lotion (1-50), and suggested to my neighbour to do the same. No case fortunately has occurred in my premises, but three cases occurred in the neighbouring house, the owner of which neglected to do what I suggested. In the same house, on the ground floor, there were some open holes leading into the drain passing under the floor, and the persons attacked were residents of the first floor.

I think this is all that I remarked about the occurrence and spread of the disease in the Fort.

DR. PECHEY-PHIPSON remarked:—

It would be interesting to know if Dr. Temulji Nariman can inform us whether, in the case of Parsees living in Dhobi Talao and the streets running out of Hornby Row and other parts of the Fort, the cases of plague were more numerous amongst the women, who spend so much of their lives on the very insanitary ground floor, than amongst the men residing in the same houses but always on the upper floors.

DR. TEMULJI BHICKAJI NARIMAN spoke as follows:—

Though my friend Dr. Ismail is very hard upon the Health Officer, and Dr. Edalji believes that the plague broke out in the Fort after the main drain was opened at Frere Road, I know that the plague cases were seen in the Fort long before the drain was opened. On the very day that Dr. Viegas made a statement before the Standing Committee, my son Dr. Ruttanshaw was called to see a Parsee boy in the Patel Street, Fort, at midnight. The boy had high fever, with vomiting and severe headache and a swelling in the groin. It was at first suspected to be a case of hernia, but the doubt was cleared up by consulting a surgeon. Though the duration of the disease was barely 24 hours the boy had low typhoid symptoms. The gland did not suppurate, and the boy recovered after a fortnight. About a week before this time another case was observed with similar symptoms on Frere Road in a house where there were plague cases later on. He was a Parsee boy, and this case occurred before the drain was opened. He too recovered in about a fortnight. As there were some cases of plague observed in this house all the tenants vacated it, and the house was white-washed and disinfected by the Municipality. About 8 weeks after it was vacated the tenants returned, and a boy in that house was again attacked with plague and was removed to the Parsee Fever Hospital to-day. This boy is the brother of the boy first attacked in this house. I don't believe atmospheric influences or the unusual rainfall or the high level of subsoil water had anything to do with the origin and spread of the disease, as it is now spreading in all parts of the Presidency under different conditions. I believe the poison to be more soil-borne than air-borne, and I believe in the influence of light and air in checking its growth. If your house is well ventilated and fully exposed to sunlight, you can safely live in that house though you may have cases in your neighbourhood. I am living in a house where for days together cases of plague occurred in my neighbourhood, and I never used a drop of carbolic acid or any disinfectant, and though I had several servants living in my house on the ground-floor not a case has occurred up to this day. The only precaution I took was allowing the sun to beat in all parts of my house all day. Its power of diffusion is very small. It is unsafe to live in an infected house, but you may safely live in the open adjoining it. As for human agency as a factor, I can say that I have noticed cases of plague removed to healthy houses in the commencement from infected houses without any inmates catching the plague, though several cases occurred in the original houses after the plague patient was removed, distinctly showing that the poison lurks in the infected area for a long time. As Dr. Peehey-Phipson wants to know whether Parsee women suffered more in proportion on account of their locating on the ground-floors during monthly sickness, I may say that a leading native paper, the *Bombay Samachar*, has drawn particular attention of the Parsee community to this evil, and showed that a large number of cases occurred among women between the ages of 15 and 30 or thereabout. I believe the segregation of the healthy of prime importance in the check of this disease.

Brig.-Surgn.-Lieut.-Col. BARKER remarked:—

In reference to Dr. Temulji's remarks, his position that light and air were complete safeguards against plague was to be balanced by my unhappy experience in having just lost a servant, who slept in my verandah, and who, if at all, frequented the bazaar but little.

Surgeon-Captain HERBERT—

I would like to ask if any one has any facts bearing on the mode of infection; the only cases referred to by Dr. Weir are examples of direct inoculation. A good example of the connection between the death of rats and the spread of the plague was seen in my own house. Soon after Malabar Hill became infected two rats died one morning—one in my stable and the other just outside. All the syces were at once turned out into the compound, and the usual disinfection carried out. No more dead rats were found, except one some weeks afterwards. But three days afterwards one of the two syces who slept in the room where the rat died was attacked by the plague and quickly succumbed. This is the only case we have had.

Contrary to what Dr. Ismail Jan Mahomed has said, Dr. Weir's chart appears to be of considerable value. It shows that the epidemic period in the Market Section was three and a half months, exactly half the duration lately authoritatively laid down, in the *British Medical Journal* and elsewhere, as peculiar to plague. The Walkeshwar Section is interesting because of the long period during which sporadic cases were reported before the disease became epidemic.

With respect to cleanliness, free ventilation and the avoidance of overcrowding as measures to check the spread of the

disease, I would remind you of the outbreak in the House of Correction. The utmost that we can ever hope to do in improvement in the native town will never bring it into a condition to compare at all with the House of Correction. Yet the outbreak there was by no means slight; 29 prisoners out of about 350 were attacked.

The number of people inoculated by Mr. Haffkine now exceeds 3,000. The only case of plague among them, in addition to those already reported, is in a Parsee boy who was either ill with the plague at the time of inoculation, or was taken ill a few hours later; the patient died. Still another person has died soon after inoculation, but it is not quite certain from what he died. The full report is not yet available.

Staff Surgeon BASSETT-SMITH, R. N., said:—

There is one point that has not been touched on so far in this discussion, namely, the almost complete immunity of the marine population from this disease. There have been three cases only, I believe, among the crews of P. & O. ships. For ourselves, except for one case, we have been quite free. This was a Goanese cook, on 27th December. The infection was distinctly traced to his home in the Fort, where he had been some days before nursing his own child, who died from the disease. His case ended fatally also.

We have 200 natives, mostly Lascars, who are Mahomedans, and frequent chiefly the market and district round the J. J. Hospital where the disease has been severe. They were of course under the best hygienic conditions on board, clean, well-fed, well-clothed and having plenty of fresh air. From the commencement of October not one of them has been allowed to spend the night on shore. For the first four months however, leave was given up to 10 P.M. either more often, or once a week when the disease became worse. All have had to wear shoes on shore, and all sores have been carefully dressed. Thus, they must have mixed with infected people, yet have escaped, and this I believe is due to the fact that in the day time they are mostly in the open air, and not lying about the floors as they would be at night—tending to the conclusion that infection may probably take place most frequently at night, and that it is most potent near the ground or floor.

I would mention that the ships are infested with rats, and that we did not leave Prince's Dock until 10th September last year, where they had opportunity of coming on board, yet up to the present they are bacteriologically healthy.

MR. HANKIN said:—

"I intend, as far as possible, to avoid committing myself to any definite opinion as to the nature of this disease and as to its mode of spread. One of the most noteworthy points in Surgeon-Captain Grayfoot's able paper is the existence of a long interval between the date of the first imported case and the appearance of local cases in various towns in the Bombay Presidency. In some cases this interval appears to extend to three months. It is impossible to express an opinion as to whether the existence of this interval is not simply due to the chance of the first imported case not happening to produce infection, and of the later local cases being due to a later importation of the disease. For the alternative possibility an analogy can be found among the phenomena of the spread of cholera. In certain of the Trans-Gogra Districts in the North-West Provinces it often happens that when the disease is carried into a village by a returning pilgrim, an interval of two or three weeks may elapse before further local cases develop. In other districts, on the other hand, it has been found that local cases develop promptly on the introduction of the virus. An important question has been raised by Dr. Weir as to whether the microbe can exist in an infectious condition for any time outside the body of the patient. It has been found by a German investigator working in Japan that it can remain alive on linen for more than a month. In the case of the two Goanese servants, who were attacked in London with plague last October, some support was given to the idea that infection was due to clothes. On investigation it was found that a few days before their infection they had unpacked and used some clothing that they had brought from Bombay, to go ashore for a spree. They had not touched this clothing during the voyage, and hence on the theory that their infection was due to clothing we can understand why they remained in good health for so long after leaving Bombay.

Surgeon-Captain GRAYFOOT hoped that soon he would have fuller information to lay before the Society regarding the spread of the disease in the Presidency. He had particularly asked for information from infected places regarding the death of rats and mice, but from only two places had he as yet received reports of the death of these animals.

The PRESIDENT, Brigade-Surgeon-Lieut.-Col. ARNOTT, said that the discussion had brought out a good deal of information and opinion on various points. Professor Hankin's remarks about the two Goanese members of the crew of

the 'Oriental,' who contracted plague in London after wearing clothes which they had brought from Bombay, were interesting. Dr. Jan Mahomed's first patients were Multanis who traded with China; and in the epidemic in Kathiawar, and Gujerat in the beginning of this century there was a record of plague prevailing in a cotton-producing district, the cotton conveyed to a town where the weavers became infected and were decimated. The disease having broken out in Mandvi, close to the Docks, gave a probability of importation from Hongkong or the Persian Gulf. But there was also a possibility of importation from Kumaon or other infected places in India, and in this connection Professor Hankin's remarks about an epidemic of rats in Rajputana were interesting.

As regards the association of plague in rats and an epidemic, though we could not say how it was spread from rats to men, the opinion that sick or dead rats were dangerous was so common that it deserved attention. Even if it could not be explained, an opinion so generally held probably had something in it. Several examples had been quoted, and he had not much to add. But it was curious that after the cases which occurred and were treated in Dr. Dimmock's compound dead rats were seen in neighbouring bungalows, and cases of plague occurred in Mr. Elton's house and Mr. Douglas's, i.e. the houses nearest to Dr. Dimmock's, and in one of these houses, possibly in both these were dead rats. When the cases occurred in Mr. Douglas's Dr. Arnott became anxious about his own servants. His stables, Mr. Dick's and Mr. Moses's are close together, with servants' rooms above. After a week or two dead rats were found in Mr. Moses's house, who vacated it, and a dead rat was found in Dr. Arnott's compound; soon after one of Mr. Moses's gorawallas took plague, and a few days later Dr. Arnott's dhobie took it. Both of these servants were at once sent to hospital and the premises were thoroughly disinfected, and up to now no further case has occurred.

The opinion of the meeting seemed to be that atmospheric conditions had not much to do with the prevalence of the disease, and nothing definite seemed to have been elicited about the influence of sub soil water.

Dr. Weir's chart showed a close relation between the total mortality and the plague mortality and appeared to confirm the popular opinion that all or nearly all of the excessive mortality was due to plague. The Table B contributed by Dr. Grayfoot, in connection with Dr. Jan Mahomed's statements that his first cases occurred on the 15th of August, shewed that the disease became epidemic then.

Dr. Grayfoot's paper and map shewed very clearly that the disease was chiefly spread by being carried by men. It was carried from one district of Bombay to another, and from Bombay has been carried to all parts of the Presidency, and even farther.

He agreed with the opinion Dr. Grayfoot had expressed, and it was satisfactory that the profession in Bombay had recognised the disease as plague early in September, and that it had been the opinion of the profession then, as it was now, that there was only one way of managing an epidemic, viz., by isolation and segregation, and disinfection.

Current Medical Literature.

MEDICINE.

THYMUS TREATMENT OF EXOPHTHALMIC GOITRE. By H. MACKENZIE, M.A., M.D. (*The American Journal of Medical Sciences*).—After giving a summary of fifteen cases reported by Owen, Edes, Cunningham, Taty and Guérin, McKie, Maule, and Metcalfe, Dr. Mackenzie proceeds to describe his experience of twenty cases treated by him at St. Thomas' Hospital with the thymus gland of the calf or the lamb, or with tabloids prepared from the thymus of young calves. He agrees with Möbius, Taty and Guérin in failing to observe any marked benefit from this mode of treatment. He found in most cases that thymus treatment had no effect on the heart and pulse, on the goitre, or on the exophthalmos; but he acknowledges that this remedy may have some influence in

improving the general condition of the patient, acting much in the same way as does cod-liver-oil. The dose, to be of any use, should be at least one or two drachms daily of the fresh gland, or its equivalent in the form of extract or powder.

Conclusions.—Of the twenty cases I have now recorded under my care, treated by the thymus gland, one died, and in six no improvement was observed. In thirteen cases there was some improvement. In none of these, however, have I observed any such decided effect produced on the most important symptoms, and on the progress of the disease, as could lead me justifiably to conclude that the thymus had any great therapeutic activity."

ON CERTAIN FEATURES IN THE PROGNOSIS OF PNEUMONIA. By W. OSLER, M.D. (*The American Journal of the Medical Sciences*).—After stating that pneumonia is the most fatal of the acute infectious diseases of adults in temperate climates, destroying from one-fourth to one-third of all persons attacked, Dr. Osler goes on to show (as has previously been done by many other observers) that the incidence of pneumonia mortality is far greater in hospitals than it is in private practice. In the former it varies from 20 to 30 per cent., whereas in the latter it may be as low as 12 per cent. The general circumstances which influence the prognosis are age, race, and habits. Pneumonia is especially fatal amongst the old, the Negro race, and the dissolute or debilitated.

Amongst the special features that influence the prognosis, Dr. Osler lays more stress on the toxæmia than on the amount of lung involved, or the pyrexia, &c.

"The toxæmia is the important element in the disorder, to which in the majority of cases the degree of pyrexia and the consolidation are entirely subsidiary. The poisonous features may develop early and cause from the outset severe cerebral symptoms, and they are not necessarily proportionate to the degree of lung involved. There may be severe and fatal toxæmia with consolidation of only one-half a lobe, while a patient with complete solidification of one lobe or of a whole lung may from beginning to close of the attack have no delirium. Many of the cases which show the most profound toxæmia present variations from the typical picture; thus there may be no cough, no expectoration, very slight fever, and no leucocytosis. * * * Probably too, the sudden and unexpected death in pneumonia may be attributed to the action of the specific toxins on the heart-centres, rather than on the muscular substance of the organ itself. This seems more reasonable than the former idea that it was the action of the high fever upon the myocardium. * * * The toxæmia outweighs all other elements in the prognosis of pneumonia; to it (in a gradual failure of strength

or more rarely in a sudden death, as in the cases here given) is due in great part the terrible mortality from this common disease, and unhappily against it, we have as yet no reliable measures at our disposal."

THE TEST FOR INDICAN IN THE URINE. By A. L. BENEDICT, M.D.—During intestinal digestion indol, skatol, and alpha-skatol-carbenic acid are formed and chiefly excreted in the feces; but a small portion reaches the urine through the circulation. In the blood indol and skatol combine with sulphates, and potassium-indoxyl-sulphate, or indican, is excreted in the urine.

Excess of indican in the urine is supposed to denote excessive formation of indol, as in constipation or in diarrhoea due to intestinal indigestion and fermentation.

"In all tests for indican it is well to use a test-tube of the same calibre and to employ about the same quantity of urine. Suppose, for example, that we employ the smallest test-tube, and about three centimetres in height of urine. Eight or ten drops of hydrochloric acid are added as an oxidizing agent and the mixture is boiled, then cooled and shaken with about half a centimetre of chloroform, which is allowed to settle at the bottom, carrying with it whatever indican may be present. From a number of control experiments, nitric acid seems to act as well as hydrochloric, and the combined acids or chlorine water certainly are efficient. During the boiling a moderate quantity of indican gives the urine a faint purplish tint, and with some good chemists the test stops here without adding the chloroform, but the test thus conducted is evanescent and not delicate enough to reveal small amounts. Still it is well to watch the urine while boiling, as an idea can be formed of the quantity of indican present. In normal urine the chloroform, after settling to the bottom of the tube, has a faint but distinct bluish tinge, and after several hours a very narrow incomplete band of indigo appears at the top of the chloroform along the side to which the tube has been leaning, seldom does a complete ring form. In very watery urine the test thus conducted may not reveal indican. If excess of urates is present, these appear as a muddy mass in the chloroform, but the indican ring is not interfered with. In urine containing a moderate excess of indican the blue tinge is quite decided, and after standing, not only is the ring more distinct than usual, but one or two little blue lumps are found at the bottom of the chloroform. In extreme indicanuria the bluish tinge is seen before adding chloroform, and the latter is immediately coloured throughout a deep navy blue. The exact amount of urine and of chloroform used is not important, except that the relative quantities stated apply well to all grades of indicanuria, and that it is wise for each observer to use always the same relative quantities in order to be able to form approxi-

mately quantitative conceptions of the amount of elimination."

NITRATE OF SILVER IN DISEASES OF THE SKIN. BY R. ABRAHAMS, M.D. (*The Journal of the American Medical Association*).—After detailing various skin affections in which nitrate of silver proves useful, Dr. Abrahams proceeds to speak enthusiastically of its employment in eczema intertrigo and in pruritus ani. He found it succeed where other drugs failed. "The site of the eczema determines the strength of the solution to be used. A 3 per cent. solution of nitrate of silver is applicable to eczema intertrigo when located behind the ears, on the penis, and between the fingers and toes. Ten to twenty per cent. in the axilla, bend of the arm, under pendulous breasts and labia majora, in the latter, especially in diabetic cases. Twenty-five to fifty per cent. on the inner surface of the thighs and pubes. On several occasions a .5 to 1 per cent. solution was applied with benefit, in the form of a wet dressing, to a scrotum which was the seat of chronic eczema for months, if not years. * * * In the treatment of pruritus ani there is nothing in the pharmacopœia better, more effective, more gratifying to the patient and his medical attendant, than the vigorous application of a strong solution of nitrate of silver. In all cases the cause should be sought, and when found removed, but if the pruritus still continues, apply a 30 or 40 or 50 per cent. solution, depending on the severity and intensity of the itching. In idiopathic pruritus nitrate of silver solution in this strength is a veritable specific. Even where there is a palpable cause, nitrate of silver will insure rest at night and quiet by day while the cause is being removed. The application should be made once or twice a week after the preliminary use of 4 per cent. cocain solution. In the interval zinc ointment may be used."

D. M. MOIR, M.A., M.B.

OBSTETRICS AND GYNÆCOLOGY.

DYSTOCIA DUE TO RETENTION OF URINE BY THE FETUS. (*Journal de Medecine de Paris*).—O. Saintu reports the case of a woman upon whom it was decided to induce labour at about the eighth month on account of a contracted pelvis. Saintu delivered the head, shoulders and thorax with ease, but the rest of the labour was conducted with great difficulty on account of immense distention of the foetal abdomen. The child did not urinate until the next night when it passed a large quantity of urine and catheterization removed more. The child died the next evening. At the autopsy the bladder was found to extend to the ensiform cartilage above, and laterally to the sides of the abdomen. The urethra was perfectly patent.

THE PATHOLOGY OF MISSED ABORTION. (*British Medical Journal*).—In a paper read before the Pathological Society of Manchester, Dr.

Forthergill held that when the foetal circulation ceased the vessels of the placenta were rapidly obliterated. The foetal epithelium covering the chorion and its villi degenerated, and the maternal blood between the villi formed clots which were altered into dense laminated fibrin. The decidual cells then multiplied and invaded the fibrin, which they gradually replaced, filling the intervillous space with layers and bands of decidual tissue. At the same time they disintegrated the foetal epithelium, which came to be represented by scattered heaps and rows of nuclei and finally disappeared. The amnion remained almost unaltered, but adhered closely to the chorion, and the united membranes were thrown into folds and convolutions, covering the rounded lobes of altered placental tissue. The foetal portion of the placenta did not grow after the death of the foetus, though the maternal portion containing the decidual cells remained active. It was, therefore, probable that malignant new growths could arise from foetal placental elements.

THE CURETTE IN LABOUR. (*British Medical Journal*).—Budin and Charpentier are quite at variance as to the use of the curette after delivery. Nitot exhibited recently a giant curette designed specially for the uterus in the puerperium where the small sharp instruments useful for the non-parous uterus are inconvenient and dangerous. In the discussion Budin declared that he no longer uses the curette after labour. He has had excellent results following the simple practice of clearing off adherent fragments with the finger, and then mopping the uterine walls. Charpentier, on the other hand, is a strong supporter of the early use of the curette under the same circumstances. Suitable cases are, in his opinion, kept waiting too long. The instrument must be employed before the infective process has become generalised; indeed, when the uterine tissue has undergone changes from that process, the curette actually increases the danger. He has never had any bad results even indirectly after the use of the curette in the puerperium.

UNDIMINISHED MORTALITY FROM PUERPERAL FEVER IN ENGLAND AND WALES. (*Medical Press and Circular*).—Dr. Cullingworth, in his inaugural address, delivered before the London Obstetrical Society, drew the attention of the profession to the death-rate from puerperal fever and to the humiliating fact that, notwithstanding the introduction of antiseptics, the almost complete banishment of the disease from the lying-in-hospitals and the general advance in our obstetrical knowledge, the death-rate has not only not diminished, but in some districts has actually increased, during the past few years. He attributes the high death-rate mainly to the large number of confinements attended by ignorant and untrained midwives and to laxity and half-heartedness in the use of antiseptics in private practice.

THE CYCLICAL OR WAVE THEORY OF MENSTRUATION, WITH OBSERVATIONS ON THE VARIATIONS IN PULSE AND TEMPERATURE IN RELATION TO MENSTRUATION. (*Medical Press and Circular*).—Dr. Arthur Giles read a paper based on observations on the temperature and the pulse before, during and after menstruation. The temperature observations embrace fifty menstrual periods in forty-five patients. From the fifty patients a composite curve has been drawn up, to which he referred as the type of the temperature curve in relation to menstruation. It shows that the temperature is lowest at the middle of the intermenstrual period; it gradually rises, attaining its maximum two days before menstruation. There is a sudden drop on the day preceding the flow with a second slighter drop at the end of the period. It rises slightly for the first week after the cessation of menstruation, and there is a third fall at the beginning of the intermenstrual period. The observations of Jacobi and Reiml have similarly been employed in the construction of composite curves; these present features similar to those shown by the author's curve. The pulse—sphygmographic tracings—were obtained from seven patients, covering nine menstrual periods and forty observations. They show that the blood-pressure is greatest on the first two days of menstruation and on the day preceding; it is lower during the remainder of the period, rising again slightly after its cessation. The total variation both in temperature and pulse, is comparatively limited. The author then discussed the bearing of these facts on the cyclical theory of menstruation, and concluded that this theory as ordinarily stated is insufficient as an explanation of the origin of menstruation. But taken in a modified form, the cyclical or periodic theory may be accepted as giving a connected idea of the meaning of menstruation, which may be regarded as the conclusion of the reproductive phase of an alternation of nutritive and reproductive activity or in other words, as a repeated preparation for the reception and nutrition of a fertilised ovum. In the absence of such an ovum, menstruation occurs as a "missed pregnancy."

INFLUENCE OF THE OVARIES DURING PREGNANCY. (*American Journal of Obstetrics*).—A series of experiments by Sokoloff upon bitches showed that if the ovaries were removed two or three weeks after conception, the continuation of pregnancy was arrested. It was also found that the time when labour was due the uterus was small and atrophic, and no traces of the impregnated ovum were present, although careful observation made it certain that the uterine contents had not been expelled. These experiments prove that contraction during pregnancy produces atrophic changes in the uterus and atrophy and absorption of the ovum.

VAGINAL vs. ABDOMINAL SECTION FOR PELVIC SUPPURATION. (*American Journal of Ob-*

stetrics).—W. D. Haggard gives as indications for posterior vaginal section and drainage: early cases of acute suppurating, salpingitis, incipient post-puerperal peritonitis, large pyosalpinx and true pelvic abscess. J. T. Johnson does not believe this always safe, and thinks the abdominal route preferable in some cases. C. P. Noble does not think either route entirely advantageous, but prefers the abdominal in most cases. H. A. Kelly says that, when possible, pus in the pelvis should be treated by vaginal puncture or section, without sacrificing any of the appendages or the uterus for drainage. L. S. McMurtry holds similar conservative view. J. W. Bové objects to anterior colpotomy unless the pus is on top and in front of the bladder. R. B. Maury holds that the abdominal or vaginal route must be selected according to the case. W. E. B. Davis pronounces in favour of vaginal incision for large collections of pus in the pelvis.

KEDARNATH DAS.

Vital Statistics & Sanitation.

THE BUBONIC PLAGUE.

(Continued from page 159.)

PROPHYLACTICS.

THE prophylactic of the plague consists, in the first line, of strict measures of blockade and quarantine; to these measures is to be ascribed the fact that the plague has ceased to figure as a universal disease.* As its importation may take place by water or land, a sanitary police supervision has to be exercised both at the frontiers and over the shipping whenever it threatens.

At the frontier, or the customs barrier,† travellers arriving from affected districts must be medically examined. All people who are sick or suspected must be isolated, and the others subjected to quarantine, for which purpose special accommodation must be provided. As the incubation of the plague only exceptionally exceeds seven days, a quarantine of this duration should suffice. The linen, clothing and other belongings of the travellers . . . those of the sick should be burnt. . . . to be watched. What goods and articles should be altogether excluded from importation from a disease-stricken country is a difficult question to answer, as every new occasion has shown. The German interdiction of 29th January 1879 regarding importation from Russia extended to used clothing, body and bed linen, rags, wastepaper, fur of all kinds, hides, bladders, guts, felt, bristles, feathers, carrion and fish. With regard to other goods, the disinfection of the coverings would appear to be desirable.

The disinfection of clothes, with the exception of leather goods, which should be rubbed with 5 per cent. carbolic acid, is best done by steam disinfecting apparatus, while body and bed linen should be put for three hours in a solution of 3 per cent. soft soap heated to 50° Celsius, there allowed to stand 48 hours and then washed in the ordinary manner. The coverings of goods are disinfected by rubbing with 5 per cent. carbolic solution.

Less difficult than the sanitary police supervision of the frontier traffic is that over the shipping which must be extended to all sea-going and river vessels coming from a diseased port. Ships which have, or have had on board, people infected with the plague must undergo quarantine, and the sick must be isolated in special quarantine hospitals, while their clothing, etc., should be burnt. The belongings of the healthy crew and passengers, etc., as well as the ship should be disinfected. For ships which have had no cases of sickness on board the quarantine may be waived; but the disinfection should take place all the same. Of particular interest

* He has already pointed out from Europe was coincident, not of quarantine measures, but with the disease. —D. D. CUNNINGHAM.

† Dr. Scheube, writing from the Continental point of view, naturally assumes the existence of a carefully guarded frontier or customs barrier, which no one can pass, even in ordinary times, without being stopped and searched. No such frontiers or barriers now exist in India. —H. H. RISLEY.

in this matter is the plague regulation issued in Egypt by the International Sanitary Board in June 1894, on the occasion of the outbreak of plague in South China. It distinguishes between infected, suspected, and clean ships. Clean ships, *i.e.*, such as come from an infected port, but have not had an ascertained or suspected case on board, are admitted to free intercourse after medical inspection. If, however, seven days should not have elapsed since departure from the infected port, that period must first be completed. Suspected ships, *i.e.*, those on which cases of the disease have occurred, but not within the previous nine days, are to be treated in a different manner, varying as they have a medical man and a disinfecting apparatus on board or not. The former are allowed to pass the Suez Canal in quarantine and with sealed hatches; the latter only after a process of disinfection of used clothing, bedding, and other susceptible articles has been carried out at the quarantine station. Mail and line steamers, having a medical officer, though not a disinfecting apparatus on board, are allowed free intercourse after previous disinfection of the used clothing, susceptible goods and of the ship itself, if for a fortnight previously no case of illness has occurred; if less than a fortnight has elapsed since the last case of anybody being taken ill, a quarantine of 48 hours is imposed besides.

Finally infected ships, *i.e.*, those which have diseased people on board, or have had such within the previous nine days, must transfer the sick to an isolated hospital. The healthy passengers must likewise disembark and be kept for seven days in quarantine, or for a shorter time, if for several days previous to arrival no more cases have originated (if the last case occurred nine days previously, then two days, and so forth); the detention is arranged in groups in order that all may not have to be further detained if a new case should occur. The clothing and bedding of all the sick are to be burnt, and the used belongings of the healthy passengers and crew, as well as the susceptible goods and the ship itself, have to be disinfected. The latter may then, seven days having elapsed since the last case of disease observed on board, be allowed free intercourse.

As regards the disinfection of ships, it is advisable to wash the different cabins, etc., with lime-water, washing it off again after 2-3 hours, to treat all utensils according to their kind in a similar manner, or to rub them, with a 5 per cent. solution of carbolic acid, to pump out the bilge water, and to disinfect the hold with lime-water. The bilge water should anyhow contain at least 2 vol. per cent. lime-water.

It is of the greatest importance, if the plague should break out in a country where it has not shown itself during the last decennial period, completely to blockade the first place where it appears by a military cordon. Provided the place is small, this is quite feasible, as is shown, among other cases, by the example of the town of Noja in Lower Italy, 1815. It is different when the disease has already spread wider, which generally happens, as is indicated by the history of recent plague epidemics, before the disease has been properly recognized, and the fear of a diagnosis, having such far-reaching consequences, has been overcome. To blockade wide tracts of country is extremely difficult, if not impossible, even in distant countries not yet in communication with the world at large; but in any case it is better to be content with an incomplete blockade than to dispense with one altogether, for anyhow a considerable portion of the infection which otherwise would spread all round will be intercepted. To do this as far as possible, besides the blockade round the infected area, additional military cordons should be established in the adjoining districts. The hotbed of the disease one must try to cut off as much as possible by isolation of the sick and of suspected cases, and by disinfection of their belongings and their dwellings. According to Kitasato's investigations, the isolation of convalescents must be carried on for one month, and disinfection has to be extended to their evacuations. The corpses of the plague-stricken must either be burnt or buried at least three metres deep. The same ought to be done with the bodies of rats, mice, etc., which have died of the plague.

Papered rooms must be disinfected by rubbing down the walls with bread, white-washed rooms done over again with lime-wash, and oil painted ones with 5 per cent. carbolic solution or white-washed and washed again after two hours; the latter process to be applied as well to the floors; those made of hard wood, inlaid, or well painted, are to be treated with carbolic solution, ill-kept ones with lime-water.

Furniture, doors, windows, frames, wainscotings, should be well washed with a 5 per cent. carbolic solution and then rubbed dry; in the same manner metal-ware, porcelain, and glassware are treated.

Huts should be destroyed by fire.

For the disinfection of the evacuations of the patients, lime-water is best. About an equal quantity of the disinfectant should be used, and the mixture left standing an hour before pouring it into the latrine.

Finally, much depends in the prophylaxis of plague on the improvement of sanitary conditions for, as we have previously seen, both the origin and the development of the disease are connected with bad hygienic conditions. The latest epidemic at Canton and Hongkong further strikingly demonstrated this to be the case.

Personal prophylaxis demands a regular mode of living, the utmost cleanliness, good ventilation of dwellings, and avoidance of all contact with the diseased, their dwellings, and belongings. The rubbing of the body, specially of the face and hands, with oil is recommended, based on the immunity said to be enjoyed by oil-carriers, etc., from contracting the disease.

THERAPEUTICS.

THE treatment of the plague is based on symptoms; unfortunately it holds out little prospect of success. In the stage of attack stimulants, chiefly alcoholic ones, are given.

From the commencement of the disease rubbing of the skin with oil is recommended; perhaps it is its efficaciousness in lowering the fever which exercises a beneficial influence. The fever-stage demands an antipyretic treatment, cold on the head, cold baths, and antifebrilia, such as quinine, antipyrin, phenacetin, etc. When a tendency to sweating arises, it ought to be encouraged by warm drinks. Later on, with declining reaction of the nervous system and typhoid conditions, stimulants, camphor, ether, etc., should again be administered. The buboes and carbuncles are treated with hot poultices, and if fluctuation occurs, are laid open by incision. In case of hemorrhages taking place, styptics, such as liquor ferri, quichlorate, secale cornutum, ergotin, etc., are to be tried.

The investigations of Yersin, Calmette and Borrel, which have been already alluded to, raise well-grounded hopes that the disease may in future be successfully treated by means of serum obtained from artificially immunised animals.

HOSPITAL ACCOMMODATION AT RANGOON.

THE full text of Dr. Sinclair's letter to the President, Rangoon Municipality, is as follows:—

I have the honour to invite attention to a paragraph in the *Rangoon Gazette* of the 2nd instant, which gives the view of the Sub-Committee appointed last year to consider the subject of the accommodation of the General Hospital. I have not yet had an opportunity of examining the supplementary report of the Sub-Committee referred to, but, supposing the facts to be as stated in the paper above cited, it may be convenient to consider the following criticism before taking action on that report:—

At page 192 of Parkes' *Practical Hygiene* (1891) accommodation for the sick is thus described.—“The desire of most hospital physicians and surgeons is to obtain for their patients, if they can, a floor-space of 100 to 200 square feet, and a cubic space of 1,500 to 2,000 cubic feet, and in this they are right.” This refers to hospitals in England, and why the area may be curtailed in smaller institutions in such a climate as is enjoyed by Rangoon is in part explained by the following passage dealing with perfidation, which occurs on page 191:—“If the air can be warmed to a certain point in a cold climate, or if the climate be warm, there may be much more rapid current, and consequently a smaller cubic space might be given.” A little lower down on the same page in discussing the difficulty in providing rooms with “ideal standard” accommodation for healthy persons, the following is met with:—“So in the case of soldiers the amount of authorized regulation space (600 cubic feet) is below the standard now given, but still the space is as much as can be demanded at present, as it has been found very difficult without incurring greater expense than the country would bear to give every man even the 600 cubic feet.”

I venture to ask: “Does the financial position of the Rangoon Municipality justify the provision of the maximum standard of accommodation for its pauper European and Eurasian sick where England is unable to provide for her soldiers even the regulation space which is below the prescribed standard? Is this the most pressing need of the Municipality? Would it not be wiser to defer going in for extreme ideals until the hygienic conditions generally have attained to a higher standard?”

It is important then to decide what superficial space per bed should suffice in Rangoon. In most of the hospitals in England with which I am acquainted beds are certainly quite as close together as those in the Rangoon hospital now stand. On several occasions since the number of beds per ward has been increased I have asked various members of the staff whether the wards on being entered at night ever smelt unpleasantly, and the reply has invariably been in the negative. This is a severe and perfectly reliable test. In his dictionary of Hygiene and Public Health, A. Wynter Blyth after referring to the superficial space per bed available in several hospitals

in Europe says:—"It may be put down that it varies in the best constructed hospital from 90 to 100 square feet." B. Arthur Whyte Legge, M.A., in his *Hygiene and Public Health* (1893) says:—"For nursing purposes at least 90 square feet, per bed is necessary and more will be required if the ward is largely used for clinical teaching." He goes on to advocate wider separation of beds in surgical wards, lying-in-wards, and wards for infectious diseases. The Jail Committee of 1890 (*vide* page 17 of their report) adopted a minimum standard of 54 square feet and 900 cubic feet per patient. King's Madras Manual of Hygiene (1880), page 37 says:—"In the latest English Poor Law Regulations on this subject, the minima are 850 cubic feet for ordinary patients, and 1,200 for puerperal or offensive cases, 700 for the infirm and aged occupying the room day and night (otherwise 500), for healthy adults 300." Looking to all these facts and bearing in mind the vastly greater facilities for natural ventilation of buildings which this climate affords, I am of opinion that the pauper European or Eurasian patient would ordinarily be sufficiently provided if 90 superficial feet were allowed to each, and in the case of an Assisted 60 or 70 superficial feet.

The president's remarks on the letter were as follows:—"You will see that Dr. Sinclair is entirely opposed to the conclusions arrived at by your Sub-Committee, on which there were all the medical men recommended by the Local Government and also a medical gentleman who is not an officer of the Local Government. I think that, between the recommendations made by your Sub-Committee and the recommendations now made by the Chief of the Medical Department, you can only leave the Local Government to decide. But though I have not had time to make a complete collection of extracts on this point, I do not think this Sub-Committee will be unwilling to listen to me if I read a few of the extracts from the works which they had before them before they came to the conclusions they had arrived at in this matter. As regards the authorities quoted by Dr. Sinclair, your Sub-Committee had the latest of them at hand when they made their report. They also had the advantage of the opinion of the two Civil Surgeons, the Resident Medical Officer, and Dr. Harry Findlay, and the Sub-Committee, after considering these authorities and opinions came to the conclusion that 120 square feet will be necessary for a European and 100 for a Native. Then, you have the authori-

ties on page 727 of the treatises on Hygiene and Public Health by Stevenson and Murphy published in 1892. The figures in a Hospital considered necessary by Drs. Parkes and DeChawmont are 100 to 200 square feet and 1,500 to 2,000 cubic feet respectively. Dr. Morin gives 60 to 70 cubic metres. He goes on to say:—"It will be found that 100 feet is the minimum floor space in general wards and this amount should be increased for acute surgical cases and clinical wards. At the Edinburgh Royal Infirmary, floor space is 149 feet, and at Halle it is 140 feet. At John Hopkins' Hospital it is only 105 feet." The writer then goes on to say:—"At Halle, in one ward they have 142 feet per bed, in another 135 feet a bed, and in the third 128 feet per bed. In Antwerp the wards were constructed 148.5 feet with a cubic space of 2,524 feet; but they actually put in more beds than was intended, which reduced the floor area to 123.7 feet and the cubic space to 2,103. At Lincoln the floor space was 115.2. I have reason to believe that Dr. Parkes originally wrote in respect to India and not as regards England. His successor, however, is at Netley Hospital, and he is Dr. Notter. In his *Theory and Practice of Hygiene* published in 1896 it is laid down on page 191:—"The desire of hospital physicians is to obtain for their patients floor space from 100 to 120 square feet and a cubic space of 1,500 to 2,000 cubic feet." At page 301 the same dimensions are laid down and it is added that for fever, severe surgical or lying in cases, the requirements are greater, being about 3,000 cubic feet area space and 140 square feet of floor area. On page 939 it is said that the Indian Army Regulations direct for each sick man from 102 to 120 square feet of superficial area and from 1,613 cubic feet of space (in the hills) to 2,400 (in the plains). In Jones' *Manual of Hygiene, Sanitation, and Sanitary Engineering*, with special references to Indian conditions, published last year, it is laid down:—"It is believed specially in regard to Native Hospitals that each bed should have a floor area of 100 square feet and wall space of 7 feet 2 inches to 9 feet."

The president then read various reports of past years from the Inspector-General of Jails emphasizing the necessity for increased accommodation in the General Hospital, and concluded by reading out the proposals, already published, to be forwarded with his note on the subject to the Local Government for opinion.

ANTI-CHOLERA INOCULATIONS. OBSERVATIONS FOR MARCH 1897.

Purulia Series

Name of the locality where cholera occurred in houses containing inoculated inhabitants.	Number of inoculated persons in the house, and particulars of the cholera patient if he was amongst the inoculated.	Number of uninoculated persons in the house, and particulars of the cholera patient if he was amongst the uninoculated.
Mr. Mathewson's depôt No. 2 containing 6 inoculated inhabitants.	Number of inoculated persons in the house were 6.	Number of uninoculated persons in the house were 14. Chandi Sirdar's batch consists of 4 coolies and himself as Sirdar of these 4 coolies— Inoculated on { Bann—husband. 26th February. { Bepon—wife. Uninoculated { Kokil—Bann's father. { Bhadu—do. mother. And Bhadu got cholera on 1st March 1897 and died on 2nd March 1897.
Mr. Mathewson's depôt No. 1	Number of inoculated persons in the house were 11.	Number uninoculated 231. In Sundari's batch there were 4 coolies. Haria, M. 35, husband, and one of the children Choitu were inoculated on 23rd February 1897, and Sundari, F. 28, wife, and the other child were uninoculated. Sundari got cholera on 4th March 1897 and was cured.
Mr. Mathewson's depôt No. 1 ...	Number inoculated 11 ...	Number uninoculated 201. Lall's batch consisted of 3 coolies, i.e., father, mother and the child Lall, M. 8, all uninoculated. Lall got cholera on 6th March 1897, died 6th March 1897.
Mr. Mathewson's depôt No. 1 ...	Number inoculated 11 ...	Number uninoculated 201. Makai's batch consisted of 9 coolies, Makai, Maku, Mungli, Dala and five other persons, and on the morning of 6th March 1897 they were all uninoculated. Mungli, Dala, Makai and Maku got cholera in the morning. Mungli, F. ch. 9, got cholera on 6-3-97, died 6-3-97. Dala M. 7 do. do. do. 6-3-97. Makai F. 28 do. do. do. 7-3-97. Maku F. 30 do. do. do. 8-3-97.

ANTI-CHOLERA INOCULATIONS. OBSERVATIONS FOR MARCH 1897.— *Contd.**Parulia Series*

Name of the locality where cholera occurred in houses containing inoculated inhabitants.	Number of inoculated persons in the house, and particulars of the cholera patient if he was amongst the inoculated.	Number of inoculated persons in the house, and particulars of the cholera patient if he was amongst the uninoculated.
Mr. Mathewson's depôt No. 1 ...	Number inoculated 49 ... Of the remaining five of Makai's batch of coolies (four of which had been already down with cholera) four were inoculated on the evening of 6th March 1897, e.g., Charga, Gorachand, Rassik and Gopinath. Rassik, M. S. inoculated, got cholera on the 7th March 1897, and died 9th March 1897.	Number uninoculated 156.
Mr. Mathewson's depôt No. 1 ...	Number inoculated 49 ...	Number uninoculated 156. Sonu, M. 25, uninoculated, got cholera on the 7th March 1897 and died
Mr. Mathewson's depôt No. 1 ...	Number inoculated 40 ...	Number uninoculated 165. Dukhu, M. 22, uninoculated, got cholera on the 8th March 1897 and was cured.
Messrs. Dwerine & Co.'s depôt	Number inoculated 33. Inoculated on 27th February 1897.	One woman named Gurnbari, uninoculated, with a suckling child, went with this batch. She took cholera and recovered.
Steamer <i>Falion</i> in her voyage from Goalundo to Dhubri.	Number of inoculated persons in the steamer 18. One among the inoculated got cholera and recovered.	Number of uninoculated persons in the steamer 414. Among the uninoculated two persons got cholera, one died on the steamer, and the other landed. The result is not known.
Steamer <i>Miri</i> in her voyage from Goalundo to Dibrugarh.	Number of inoculated persons in the steamer 26.	Number uninoculated 398. Seventeen out of the uninoculated got cholera, seven recovered, and ten died.
Steamer <i>Duffa</i> in her voyage from Goalundo to Dibrugarh, 8-3-97 to 17-3-97.	Number of inoculated persons in the steamer 28. Of these only one was attacked with cholera and was landed in Gauhati cholera hospital.	Number of uninoculated persons in the steamer 389. Of these four were attacked with cholera, one was landed at Dhubri, two cases landed at Gauhati, and one died.
Steamer <i>Penguin</i> in her voyage from Goalundo to Dibrugarh, 10-3-97 to 16-3-97.	Number inoculated 52. Of these two were attacked, one landed at Gauhati, and the other died.	Number uninoculated 254. Of these thirteen were attacked, four recovered, six died, and three landed at Gauhati.
Steamer <i>Merlin</i> in her voyage from Goalundo to Dibrugarh, 12-3-97 to 18-3-97.	Number inoculated 112 Of these two were attacked, one died, and the other landed at Gauhati.	Number uninoculated 502. Of these fifteen were attacked, seven died, seven landed at Gauhati, and one at Tezpur.
Steamer <i>Khaloo</i> in her voyage from Goalundo to Dibrugarh, 13-3-97 to 19-3-97.	Number inoculated 30 ... Of these one was attacked and died.	Number uninoculated 470. Of these eleven were attacked, two died, six landed at Gauhati, and three at Dibrugarh.
Steamer <i>Heron</i> in her voyage from Goalundo to Dibrugarh, 15-3-97 to 21-3-97.	Number inoculated 63 ... Of these one was attacked and cured.	Number uninoculated 214. Of these twelve were attacked, six died, and six landed.
Steamer <i>Kestrel</i> in her voyage from Goalundo to Dibrugarh, 17-3-97 to 23-3-97.	Number inoculated 10 ... None attacked.	Number uninoculated 256. Of these three were attacked, one died, and two landed in convalescent state.
Steamer <i>Hawk</i> in her voyage from Goalundo to Dibrugarh, 19-3-97 to 25-3-97.	Number inoculated 6 ... Of these one was attacked and died.	Number uninoculated 290 Of these thirty-seven were attacked, seventeen died, one recovered, and nineteen landed at Gauhati, Tezpur, Kokila, Desang and Dibrugarh.
Steamer <i>Maricari</i> in her voyage from Goalundo to Dibrugarh, 21-3-97 to 27-3-97.	Number inoculated 44 ... Of these two were attacked and died.	Number uninoculated 467. Of these three were attacked, one landed at Dibrugarh, and two at Tezpur.
Steamer <i>Afghan</i> in her voyage from Goalundo to Dibrugarh, 22-3-97 to 28-3-97.	Number inoculated 29 ... Of these one was attacked and landed.	Number uninoculated 408. Of these seventeen were attacked, seven died, and ten landed.
Steamer <i>Penguin</i> in her voyage from Goalundo to Dibrugarh, 23-3-97 to 29-3-97.	Number inoculated 5 ... None attacked.	Number uninoculated 319. Of these three were attacked, and landed at Gauhati cholera hospital.
Steamer <i>Duffa</i> , trip 6 in her voyage from Goalundo to Dibrugarh, 24-3-97 to 30-3-97.	Number inoculated 20 ... None attacked.	Number uninoculated 552. Of these nine were attacked, one died, and eight landed.
Steamer <i>Merlin</i> in her voyage from Goalundo to Dibrugarh, 25-3-97 to 31-3-97.	Number inoculated 98 ... Of these three were attacked, one died, and two landed.	Number uninoculated 210. Of these five were attacked, one died, and four landed.

ANTI-CHOLERA INOCULATIONS. OBSERVATIONS FOR FEBRUARY 1897.

Purulia Series.

Name of the locality where cholera occurred in houses containing inoculated inhabitants.	Number of inoculated persons in the house, and particulars of the cholera patient if he was amongst the inoculated.	Number of uninoculated persons in the house, and particulars of the cholera patient if he was amongst the uninoculated.
Mr. Marcus' dépôt No. 3	Number inoculated 64	Number uninoculated 88. Masni, uninoculated, F. 25, belonged to a family of seven, of which three were inoculated, <i>e.g.</i> , Dalsing, Sukhbaro and Dardo. Masni got cholera on 14th February 1897, and died on the same day.
Mr. Marcus' dépôt No. 3	Number inoculated 65	Uninoculated 63. Tiko, F. 12, uninoculated, belonged to the sumo family as Masni, got cholera on 15th February 1897, and died on 15th February 1897. So that in a family of seven the three inoculated did not get cholera, and of the four uninoculated three got cholera in the space of 48 hours and died within that time.
Mr. Marcus' dépôt No. 3	Number inoculated 76	Number uninoculated 87. Khoari, uninoculated, belonged to a family of six, of which the father Mungra, and one of the daughters Soani, inoculated, and the remaining four uninoculated. Of these Khoari was attacked with cholera on 17th February 1897, and died 17th February 1897. Khoari was a female child aged 7.
Mr. Marcus' dépôt No. 3	Number inoculated 78	Number uninoculated 52. Bachoa belonged to a family of four, the father Jakoa and sister Mundi, inoculated, and of the two remaining uninoculated, Bachoa got cholera on 18th February 1897 and died.
Mr. Marcus' dépôt No. 3	Number inoculated 99 1. Lallia belonged to a family of six, of which four were inoculated on 18th February 1897. Of the inoculated Lallia got cholera on 21st February 1897, <i>recovered</i> . Cholera only two days after inoculation. 2. Budhn belonged to a family of nine, of which six were inoculated, including himself and his wife on 14th February 1897. Budhn got cholera 21st February 1897, and died 21st February 1897. Here is an attack of cholera seven days after inoculation. 3. Bhuraugi, wife of the above Budhn, got cholera on 21st February 1897, <i>recovered</i> . Cholera seven days after inoculation. 4. Methai and Ganpat belonged to a family of six, of which Methai, Ganpat and three others inoculated on 18th February 1897. Two days after inoculation Methai got cholera, and died 25th February 1897, while three days after inoculation, 5. Ganpat got cholera, <i>i.e.</i> , 22nd February 1897, and died 26th February 1897. Of these cases of cholera among the inoculated three got cholera within the space of 22 hours after inoculation.	Number uninoculated 30.

J. C. VAUGHAN,
Surgeon-Captain, on special duty.

ANTI-CHOLERA INOCULATIONS.

Purulia Series

Month.	HINDUS.					MAHOMEDANS.					OTHER CASTES.					Grand Total.	REMARKS.
	Adults.		Children under 12 years.		Total.	Adults.		Children under 12 years.		Total.	Adults.		Children under 12 years.		Total.		
	M.	F.	M.	F.		M.	F.	M.	F.		M.	F.	M.	F.			
March 1897.	114	41	19	8	185	2	...	2	1	5	493	399	33	31	956	1,146	Of these 105 were villagers of three villages, and the rest coolie emigrants in the local coolie depôts.

J. C. VAUGHAN,
Surgeon-Captain, on special duty.

Correspondence.

ADIPOCERE IN INDIA.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—In reply to Dr. George H. F. Nuttall's query, *Has Adipocere been observed in India?* which was published at page 134 of the *Indian Medical Gazette* for April, 1897, I request the favour of your inserting the following remarks:—

1. I must protest against the disagreeable tone of Dr. Nuttall's remarks concerning the late Dr. Coull Mackenzie and his observations on Adipocere.

In common with most medical men now in Calcutta I had the privilege of knowing Dr. Coull Mackenzie, and I think they will agree with me in saying that he was a careful and accurate observer, cautious in his statements, and one who had an exceptionally extensive experience in the morbid anatomy of the human subject. For many years he was Professor of Medical Jurisprudence at the Calcutta Medical College, Superintendent of the Campbell Medical School, and Police Surgeon for Calcutta. Dr. Coull Mackenzie's status as a teacher and medico-legal expert of long experience deserves more respect than is accorded by Dr. Nuttall, when, by implication, he suggests "the unpractised eye" that might be deceived into mistaking the ordinary effects of "putrefaction and maceration" for the process of saponification.

If Dr. Nuttall had been a Civil Surgeon in Eastern Bengal, I do not think his senses of sight and smell would ever have misled him into mistaking for adipocere the bloated, stinking, discoloured corpses fished up by the Police out of rivers and tanks, and brought long distances in slow-going country carts for the gruesome task of post-mortem examination by District Civil Surgeons.

2. My experience of medico-legal post-mortem work in India has been extremely limited, yet I believe I am in a position to corroborate Dr. Coull Mackenzie's observations on adipocere.

In September, 1891, the health of the Civil Surgeon at Chitagong suddenly broke down, and his work was carried on for a time by a Bengali Assistant-Surgeon. Amongst other duties, the latter had to make a post-mortem on a young adult Bengali female who had died under suspicious circumstances. After my arrival to relieve the Civil Surgeon, I was informed by the Magistrate that there were grounds for distrusting the Civil Assistant Surgeon's report, and therefore he requested me to exhume the body and make a further examination. I confess I set about this duty rather reluctantly, firstly, because the exhuming and examination of a body that had been three weeks buried seemed very disagreeable; secondly, because I expected that decomposition would have advanced too far in that hot, moist climate for me to confirm or disprove the Assistant-Surgeon's statement with any certainty; and, thirdly, because I expected I should have to waste the greater part of a day on a work of supererogation, hunting for a corpse buried several miles from the town.

However, on the 6th October 1891, I went down the Karanfuli river, some seven miles in a sampan, and then tramped across the paddy-fields for a couple of miles till I came to a large tank, on the bank of which the body was said to be buried. I may mention that it is a common custom amongst the Mahomedans of Lower Bengal to make a burial-ground on the banks of a tank, and such an arrangement does not prevent them from using the tank water for various domestic purposes.

The body had been buried for three weeks; therefore I anticipated a most unpleasant experience on its disinterment. I was greatly surprised to find that there was scarcely any disagreeable smell, and that the body had undergone apparent saponification. In fact the body was in such a good state of "preservation" (shall I say?), owing to its apparent conversion into adipocere, that I was able to confirm the Assistant-Surgeon's report in every particular.

Owing to what I had been taught in Europe concerning adipocere, I was naturally very much surprised to find its apparent occurrence so soon after death. But I remembered having read Dr. Coull Mackenzie's reported cases, and I elected to accept his observations and the evidence of my own senses in preference to the teachings of European text-books and teachers.

It will be noticed that the body was buried in September and was dug up early in October, i.e., at the close of the rainy season. The body was about three feet under the soil, which was alluvium with a substratum of clay. The soil was very moist, owing to the rainfall of the three previous months,

and owing to the subsoil moisture from the tank. Consequently the conditions were similar to those described by Dr. Coull Mackenzie as favourable for the early formation of adipocere.

3. Of course Dr. Nuttall may still say—"It remains an open question what it was that he observed and called saponification." Also his objection still holds good that no chemical examination was made.

I surmise that Dr. Nuttall has viewed the subject through the spectacles of the specialist in physiological or pathological chemistry. The result has been to render his field of vision very circumscribed, and this has led him to stigmatise Dr. Coull Mackenzie's description as "most superficial, and totally wanting in scientific detail." But he seems to be unaware that Dr. Coull Mackenzie was one of the most hard-worked officials in Calcutta, whose multifarious and onerous duties left him little leisure for writing or laboratory research. He may be described as a victim of over-work, who died suddenly and prematurely from its effects.

I imagine that Dr. Coull Mackenzie must have felt so sure that he was dealing with adipocere, that he did not consider a chemical examination necessary. I know that was my feeling in the case observed by me. But even if I had desired to remove a portion of the body for chemical analysis, I could not have done so on account of opposition from some of the relatives who were present. If the condition described is not that of true adipocere, it is a very good imitation. It is certainly not "simply the effects of putrefaction and maceration," such as can be seen at any anatomical dissecting room or zoological laboratory. However, I daresay Dr. Nuttall's doubts can be set at rest by the Chemical Examiner to Government in Calcutta, if a specimen is sent to him for analysis from the next body discovered in this supposed condition of adipocere.

PRESY. GENL. HOSPL.,
CALCUTTA;
12th April, 1897.

D. M. MOIR,
Surgeon-Captain, I. M. S.

THE INDIAN MEDICAL GAZETTE.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—I enclose a letter which appeared in the *Pioneer* of April 1st; in truth a good day for its appearance. I am not aware that there is as yet any better medical journal than the *Indian Medical Gazette* in India, and I suppose the Government is of the same opinion. The paper is sent monthly for circulation among the medical subordinates in each district, after which it is placed in the Library of the Civil Surgeon, where it remains for reference. If, as Civil Surgeon weakly suggests, the *Indian Medical Gazette* is supported by "immature or a worn-out talent in Indian Medical Officers," let him and those who think with him contribute to it, and so raise it above mediocrity.

ANOTHER CIVIL SURGEON.

THE INDIAN MEDICAL INCUBATOR.

TO THE EDITOR.

SIR,—The March number of the *Indian Medical Gazette* just to hand—24th. Will you let me suggest, that with the prevailing scarcity, our Imperial Government might withdraw the support they are giving to the tottering relic (?) a support that greatly hampers the success of the free medical press in India. I make the proposal because the supported relic must continue to be taken as the voice of the Indian Medical Service to which I belong, or as another puts it:—"Must be taken as nursing an immature or a worn-out talent in Indian Medical officers and as supported by Government with that intent." I hope you will publish this letter, because I cannot send it to the *Indian Medical Gazette*, and it might not be seen elsewhere.

CIVIL SURGEON.

LIGATURE OF THE EXTERNAL ILIAC FOR ELEPHANTIASIS.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—In your issue of February last appears the report of a case, in which the external iliac artery was tied for the treatment of elephantiasis of the lower limbs. As this operation has long since been abandoned as unjustifiable, it would be interesting to know if, in this case, there were any special reasons for its performance.

The matter is so important that a recapitulation of the reasons, which led to the condemnation of this operation, seems desirable.

In the first place, the disease is not one which, under ordinary circumstances, threatens the life of the patient, nor one which justifies the performance of any operation involving serious risk of life. Yet to ligature the main artery of an elephantoid limb, a limb which is liable to attacks of violent inflammation and serious disturbances of nutrition as the result of trivial causes, is to perform an operation fraught with very considerable danger to the life of the patient. The published records show a very heavy mortality. Eppner reports 49 cases followed by 5 deaths—a mortality of 10 per cent. Bryant had one death out of four cases; Fayrer one out of three; and Jameson records one fatal case.

The second point is that the operation, in a great number of cases, fails to afford any relief, and even in those cases in which improvement does occur, the beneficial results are only temporary. Jameson collected reports of 28 cases, in the majority of which the results were negative. Buchanan collected 12 cases, 4 of whom were not benefited; Fischer 21 cases, 10 of whom were not benefited; Wernher 32 cases, 16 of which were unsuccessful. Of 31 cures reported by Eppner, 9 were known to have relapsed; and out of 32 cases reported by Wernher, permanent relief was obtained in only three. Buchanan operated upon a case, the result of which led him to speak warmly of the operation, in spite of the unfavourable criticisms of Syme and others. At the same time he pointed out the imperfection of our information as to the permanence of such cures. Shortly afterwards, his own patient, whom he thought he had cured, was seized with fresh attacks of inflammation and the limb returned to its former size. He concludes, "in this case therefore the success obtained was only temporary, and a knowledge of this fact must necessarily induce us to look with some suspicion upon other published cases in which we have no information as to the state of the patient, long after the operation." There is no doubt that improvement does follow in some cases, that survive the operation, but the beneficial results are in reality due, not to the effects of the operation, but to the associated treatment, namely, rest, elevation of the limb and bandaging. Equally good results can be brought about by the latter means alone. This fact was clearly demonstrated by a case published so long ago as 1879 (*Lancet*, Vol. I, 1879, page 44); in this case both limbs were affected, but in only one was the artery tied. Seven weeks after the operation both limbs had diminished very considerably in girth, but the limb which had not been operated upon improved to a greater extent than the other one.

In conclusion it may be said that our knowledge of the pathology of the disease does not lead us to expect any permanent benefit from such an operation. Neither this, nor any other operation, can restore the damaged lymphatics, nor re-establish the normal circulation of the lymph.

J. MAITLAND, M.D.,

GENERAL HOSPITAL; *Surgeon-Lieut.-Col.*
Madras, 11th March 1897.

Appointments, Leave, &c.

BENGAL.

Surgeon-Major R. H. Charles, M.D., M.Ch., F.R.C.S.I., Professor of Surgical and Descriptive Anatomy in the Medical College, Calcutta, and *ex-officio* 2nd Surgeon to the College Hospital, is granted furlough on medical certificate for twelve months, with effect from the date on which he may avail himself of it.

Surgeon Lieutenant-Colonel J. Lewtas, M.D., Civil Surgeon of Chittagong, is appointed to officiate as Professor of Surgical and Descriptive Anatomy in the Medical College, Calcutta, and *ex-officio* 2nd Surgeon to the College Hospital during the absence on furlough on medical certificate of Surgeon-Major R. H. Charles, M.D., M.Ch., F.R.C.S.I., or until further orders.

Surgeon-Colonel J. H. Newman, M.D., I.M.S. (Bengal), is appointed to officiate as Inspector-General of Civil Hospitals, Bengal, during the absence of Surgeon-Colonel G. L. Ross on furlough on medical certificate, or until further orders.

Assistant-Surgeon Purna Chandra Parkait made over charge of the Mymensingh Jail to Surgeon-Captain B. C. Oldham on the forenoon of the 13th March 1897.

Surgeon-Captain W. J. Buchanan made over charge of the Bardwan Jail to B. C. Oldham on the forenoon of the 13th March 1897. Colonel W. H. Gregg on the afternoon of the 13th March 1897.

Mr. M. S. Emerson made over charge of the Buxar Central Jail to Surgeon-Captain W. J. Buchanan on the forenoon of the 15th March 1897.

Surgeon-Captain F. J. Drury, Resident Physician, Medical College Hospital, Calcutta, and Professor of Pathology, Medical College, is appointed, on return from leave, to act as Civil Surgeon of Chittagong, during the absence, on deputation, of Surgeon-Lieutenant-Colonel J. Lewtas, or until further orders.

On being relieved of his appointment in the Cooch Behar State, Surgeon-Captain Jay Gould is appointed to act as Deputy Sanitary Commissioner, Metropolitan and Eastern Bengal Circle.

Surgeon-Captain Jay Gould, Officiating Deputy Sanitary Commissioner, Metropolitan and Eastern Bengal Circle, is appointed temporarily to be a Health Officer of the Port of Calcutta in addition to his own duties.

The undermentioned Senior Assistant-Surgeons of the Indian Subordinate Medical Department are permitted to retire from the service, with effect from the dates specified, subject to Her Majesty's approval:—

Honorary Surgeon-Captain John Fitzpatrick, Bengal Establishment, 11th November 1896.

Honorary Surgeon-Captain Henry Hawkes, Madras establishment, 1st January 1897.

Surgeon-Major L. A. Waddell, M.B., I.M.S. (Bengal), Chemical Examiner and Professor of Chemistry in the Medical College, Calcutta, is granted furlough on medical certificate for six months, with effect from the 6th April 1897.

Surgeon-Major L. A. Waddell, M.B., I.M.S. (Bengal), Chemical Examiner and Professor of Chemistry in the Medical College, Calcutta, is granted furlough on medical certificate for six months, with effect from the 6th April 1897.

Surgeon-Captain R. Heard, M.B., B.Ch., I.M.S. (Bengal), was employed under the Government of the Punjab from the 18th January to the 12th February 1897, and under the Foreign Department on plague duty from the 13th February to the 24th March 1897. His services were replaced temporarily at the disposal of the Government of the Punjab, with effect from the 26th March 1897.

Surgeon-Lieutenant J. A. Black, M.B., C.M., I.M.S. (Bengal), was employed under the Government of the Punjab from the 22nd February to the 21st March 1897, and his services were placed temporarily at the disposal of the Foreign Department for plague duty, with effect from the 24th March 1897.

The services of Surgeon-Major R. Ross, Indian Medical Service (Madras), are replaced at the disposal of the Military Department, with effect from the 30th March, 1897, the date on which he was relieved of the duties of officiating Residency Surgeon at Bangalore.

To be Surgeon-Colonel.

Brigade-Surgeon-Lieutenant-Colonel George Bainbridge, M.D., Bombay Establishment. Dated 4th October 1896.

To be Brigade-Surgeon-Lieutenant-Colonel.

Surgeon-Lieutenant-Colonel Charles Henry Joubert, Bengal Establishment. Dated 1st September 1896.

To be Surgeon-Lieutenant-Colonel.

Surgeon-Major Charles Henry Beatson, Bengal Establishment. Dated 30th September 1896.

That date of retirement of Brigade-Surgeon-Lieutenant-Colonel William Price, M.D., Madras Medical Establishment, notified in the *London Gazette* of the 19th May 1896, is altered to 7th April 1896.

Surgeon-Major P. D. Pank, Indian Medical Service (Bengal), Residency Surgeon in Mewar, is appointed to officiate as Residency Surgeon at Jaipur, with effect from the date of assuming charge, and during such time as Brigade-Surgeon-Lieutenant-Colonel T. H. Hendley, C.I.E., may officiate as Inspector-General of Civil Hospitals in the North-Western Provinces and Oudh, or until further orders.

Surgeon-Major W. H. Neilson, M.B., Indian Medical Service (Madras), Civil Surgeon of Bikaner, is appointed to officiate as Residency Surgeon in Mewar, with effect from the date of assuming charge, *vice* Surgeon-Major P. D. Pank, and until further orders.

ASSAM.

The services of Surgeon-Captain L. Rogers, M.B., F.R.C.S., which were placed temporarily at the disposal of the Chief Commissioner in Home Department Notification No. 296

(Medical), dated the 6th April 1896, are replaced at the disposal of the Government of India in that Department with effect from the date on which he finishes his enquiries in connection with the origin and causation of *Kala-azar*.

Surgeon-Major E. R. W. C. Carroll, Civil Surgeon, Shillong, is transferred to the Kamrup district.

Surgeon-Major R. N. Campbell, M.B., Civil-Surgeon, Kamrup, is transferred to the Kasi and Jaintia Hills district.

N.W. PROVINCES AND OUDH.

The undermentioned officers, whose services have been placed at the disposal of this Government, are attached to the divisions noted below, with effect from the dates specified against their names, for duty in connection with Famine Relief:—

Military Assistant-Surgeon H. A. Richardson, Allahabad, 23rd February 1897.

Military Assistant-Surgeon G. R. Haines, Lucknow, 25th February 1897.

The undermentioned officers, whose services have been placed at the disposal of this Government, are attached to the districts noted below, with effect from the dates specified against their names, for duty in connection with precautions against bubonic plague:—

Military Assistant-Surgeon C. E. Daris, Meerut, 22nd February 1897.

Military Assistant-Surgeon W. A. Lemondine, Fyzabad, 22nd February 1897.

Military Assistant-Surgeon N. O. J. Apear, Muttra, 23rd February 1897.

Surgeon-Captain C. Thomson, M.B., C.M., I.M.S., whose services have been placed temporarily at the disposal of this Government, to officiate as a Civil Surgeon, 2nd class, and to be posted to the Bareilly district.

Surgeon-Captain J. Davidson, M.B., C.M., who was attached to the Allahabad Division for duty in connection with Famine Relief by Notification No. ⁴³_{S-55}, dated the 6th January 1897 (Scarcity Department), is transferred to duty in connection with precautions against bubonic plague in Allahabad.

Surgeon-Captain A. Miller, on duty in connection with precautions against bubonic plague, Allahabad, is transferred with Famine Relief in the Allahabad Division.

Surgeon-Captain C. Thomson, Officiating Civil Surgeon, from Bareilly to Aligarh.

Surgeon-Major C. P. Lukis, Civil Surgeon, from Bareilly to Agra.

Surgeon-Lieutenant-Colonel A. J. Willcocks, Civil Surgeon, from Agra to Naini Tal.

The services of the undermentioned officers are placed temporarily at the disposal of the Government of the North-Western Provinces and Oudh for employment on plague and famine duty with effect from the dates on which they respectively assumed charge of their duties:—

Surgeon-Captain A. W. Dawson, M.D., I.M.S. (Bengal).
Surgeon-Captain B. R. Chatterton, M.D., M.Ch., F.R.C.S.I., I.M.S. (Bengal).

Surgeon-Captain J. Mulvany, I.M.S. (Bengal).

Surgeon-Lieutenant C. H. Bensley, I.M.S. (Bengal).

Surgeon-Lieutenant J. C. Robertson, M.B., C.M., I.M.S. (Bengal).

Surgeon-Lieutenant C. D. Davies, I.M.S. (Bengal).

Surgeon-Lieutenant C. B. Harrison, M.B., C.M., I.M.S. (Madras).

Surgeon-Lieutenant J. S. Stevenson, I.M.S. (Bengal).

Surgeon-Lieutenant A. Miller, I.M.S. (Madras).

Surgeon-Lieutenant H. R. Brown, I.M.S. (Madras).

Surgeon-Lieutenant-Colonel W. H. Cadge, Civil Surgeon, from the medical charge of the camp of His Honor the Lieutenant-Governor and Chief Commissioner, to the Bareilly district.

Surgeon-Captain A. E. Roberts, Civil Surgeon, from Bareilly to the medical charge of the camp of His Honor the Lieutenant-Governor and Chief Commissioner as a temporary measure.

The services of Surgeon-Captain A. E. Roberts, M.B., I.M.S. (Bengal), are replaced at the disposal of the Government of the North-Western Provinces and Oudh with effect from the 4th March 1897.

The services of Surgeon-Captain J. Chaytor-White, M.D., C.M., I.M.S. (Bengal), are placed permanently at the disposal of the Government of the North-Western Provinces and Oudh.

Munshi Jagannath Prasad, LL.B., Pleader, to officiate as Munshi of the Kheri Munshi in the Sitapur Judgeship, vice Munshi Krishna Kumar, granted leave.

Surgeon-Captain R. E. Molesworth, A.M.S., to the civil medical charge of the Almora district, in addition to his military duties, with effect from the 21st March 1897.

With effect from the 2nd February 1897, *vice* Surgeon-Lieutenant-Colonel W. A. D. Fasken, Civil Surgeon, 2nd class, deceased:—

Surgeon-Captain H. B. Melville, Civil Surgeon, 2nd class, substantive *pro tempore*, to be confirmed in that appointment, but to continue to officiate as Superintendent, Central Prison, Lucknow.

Surgeon-Captain J. Chaytor-White, Officiating Civil Surgeon, to be Civil Surgeon, 2nd class, substantive *pro tempore*.

Surgeon-Captain J. Mulvany, on duty in connection with famine relief, Mirzapur, is transferred to duty in connection with precautions against bubonic plague at Manikpur in the Banda district.

Surgeon-Lieutenant C. D. Davies, on duty in connection with precautions against bubonic plague at Manikpur in the Banda district, is transferred to duty in connection with famine relief in the Hamirpur and Jalaun districts.

Military Assistant-Surgeon G. R. Haines, on duty in connection with famine relief, from Lucknow to Banda.

Surgeon-Lieutenant-Colonel W. A. May, for six months, on private affairs.

Surgeon-Captain R. H. Maddox, 18th Bengal Infantry, for three months (m. c.)

3rd class Assistant-Surgeon John William Lawrence, for six months, on medical certificate, under the Furlough Rules of 1889.

Surgeon-Major B. W. C. Deebie, for six months, on medical certificate.

Surgeon-Captain J. T. Daly, 8th Bengal Cavalry, for one year. Pension service, 11th year, commenced 9th June 1896.

2nd class Assistant-Surgeon Thomas Henry Bounar, for three months, on medical certificate, under the Furlough Rules of 1889.

Surgeon-Captain R. C. Macwatt, 7th Bengal Cavalry, for six months on private affairs.

Assistant-Surgeon William Mann, for ten months, on medical certificate, under the Furlough Rules of 1889.

Surgeon-Lieutenant E. B. Steel, Jhansi, 1st April 1897.

Surgeon-Captain E. H. Coudon, Saharanpur, 1st April 1897.

Surgeon-Captain C. Dalton, Ghaziabad, 3rd April 1897.

Surgeon-Captain J. F. Kelly, Lucknow, 4th April 1897.

The services of the undermentioned officers are placed temporarily at the disposal of the Government of the North-Western Provinces and Oudh for employment on plague duty, with effect from the dates on which they respectively assumed charge of their duties.

Surgeon-Captain C. Dalton, R.H.S., A.M.S.

Surgeon-Captain J. F. M. Kelly, M.B., A.M.S.

Surgeon-Captain E. H. Condon, M.B., A.M.S.

Surgeon-Lieutenant E. B. Steel, M.B., A.M.S.

CENTRAL PROVINCES.

The services of Surgeon-Captain J. J. Bourke, B.B., B.Ch., I.M.S., Bengal, are placed temporarily at the disposal of the Chief Commissioner of the Central Provinces, for employment on plague duty, with effect from the date on which he assumed charge of his duties.

The undermentioned Surgeon-Lieutenant appointed to the Madras Establishment in G. G. O. No. 1066 of 1896, reported his arrival at Bombay on the date specified:—

Fredrick Arthur Lucas Hammond, 16th October 1896.

The services of Surgeon-Lieutenant C. Thomson, M.B., C.M., I.M.S. (Bengal), are placed temporarily at the disposal of the Government of the North-Western Provinces and Oudh, with effect from the date on which he was relieved of his special famine duties at Saugor.

Lieutenant D. G. Peart, whose services have been placed temporarily at the disposal of the Chief Commissioner by Government of India, Home Department, Notification No. 171, dated the 23rd February, is appointed to officiate as Cantonment Magistrate, Kamptee, during the absence on leave of Major E. M. Nedham, or until further orders.

Surgeon-Colonel J. H. Newman, M.D., I.M.S. (Bengal), is appointed to officiate as Inspector-General of Civil Hospitals, Bengal, during the absence of Surgeon-Colonel G. C. Ross on furlough on medical certificate, or until further orders.

Surgeon-Captain W. H. Ogilvie, M.B., C.M., Bengal Establishment, whose services have been temporarily placed at the disposal of the Chief Commissioner, Central Provinces, by Government of India, Home Department, Notification No. 79, dated the 4th instant, is posted to the Jubbulpore District on special famine duty.

BOMBAY.

The services of the undermentioned officers are placed temporarily at the disposal of the Government of Bombay for employment on plague duty with effect from the dates on which they respectively assumed charge of their duties:—

Surgeon-Captain C. T. Hudson, I.M.S. (Bombay).
Surgeon-Captain C. H. Bedford, M.D., C.M., I.M.S. (Bengal).
Surgeon-Captain C. Milno, I.M.S. (Bengal).
Surgeon-Captain E. A. R. Newman, M.A., B.S., I.M.S. (Bengal).

Surgeon-Lieutenant B. H. F. Leumann, M.B., I.M.S. (Bombay).

Surgeon-Lieutenant H. J. K. Bamfield, I.M.S. (Bengal).
Surgeon-Lieutenant V. B. Bennett, M.B., B.S., I.M.S. (Bombay).

Surgeon-Lieutenant S. Evans, M.B., C.M., I.M.S. (Bombay).
Surgeon-Lieutenant A. Hooton, I.M.S. (Bombay).
Surgeon-Lieutenant A. W. R. Cochrane, M.B., I.M.S., (Bengal).

Surgeon-Lieutenant N. R. J. Rainier, I.M.S. (Bengal).
Surgeon-Lieutenant W. J. Niblock, M.B., M.Ch., I.M.S. (Madras).

Surgeon-Lieutenant H. J. Walton, I.M.S. (Bengal).
Surgeon-Lieutenant A. E. H. Pinch, I.M.S. (Bengal).
Surgeon-Lieutenant J. W. Cornwall, I.M.S. (Madras).
Surgeon-Lieutenant W. G. Richards, I.M.S. (Madras).

Surgeon-Captain J. B. Smith, B.A., M.B., M.Ch., held charge of the office of District Medical Officer, Bijapur, from the 29th January to the 2nd February 1897, both days inclusive.

Mr. P. A. Cordeiro, I.M. & S., Shetphal Tank Work, Poona District, with effect from the 26th February 1897, forenoon.

Mr. J. V. P. ... & S., Amalner-Dharanga, on Railway ... with effect from the 27th February 1897, forenoon.

Surgeon-Captain T. E. Dyson, Magistrate, First Class, in the Surat District, is invested with the following additional powers:—

Power to take cognizance of offences upon complaint (Section 191, Criminal Procedure Code).

Power to take cognizance of offences upon Police reports (Section 191, Criminal Procedure Code).

Surgeon-Major J. C. H. Peacocke, Civil Surgeon, Karwar, is appointed to be a nominated Commissioner of the Karwar Municipality in the Kanara District, *vice* Surgeon-Captain W. C. Sprague, M.B., resigned on transfer.

Surgeon-Captain W. Carr Sprague and Surgeon-Major J. C. H. Peacocke respectively delivered over and received charge of the Karwar Prison on the 8th March 1897, before office hours.

Surgeon-Lieutenant A. Gwyther, M.B., C.M., from 14th February 1897.

Surgeon-Lieutenant N. R. J. Rainier from 15th February 1897.

His Excellency the Governor in Council is pleased to appoint Surgeon-Lieutenant-Colonel H. W. B. Boyd, F.R.C.S., to act as Surgeon, Gokaldas Tejpal Native General Hospital, Bombay, in addition to his own duties, during the absence on leave of Surgeon-Lieutenant-Colonel D. N. Parakh or pending further orders.

His Excellency the Governor in Council is pleased, under Section 12 of the Code of Criminal Procedure, 1882, to appoint Surgeon-Captain T. E. Dyson, M.B., C.M., to be a Magistrate of the First Class in the district of Surat.

Surgeon-Captain E. M. Pilcher, for six months, on private affairs.

Surgeon-Captain A. G. Thompson, for six months, on medical certificate.

Surgeon-Captain J. Fishor, M.A., to the officiating medical charge of the Regiment.

Assistant-Surgeon M. G. Desai has been appointed to the medical charge of the Segregation Hospital, Amalsad, in the Surat District, on plague duty, with effect from 18th February 1897.

Surgeon-Lieutenant B. H. F. Leumann, M.B., was placed under the orders of the Health Officer of the Port of Bombay from 30th January, forenoon, to 1st February 1897 inclusive, on plague duty.

Surgeon-Captain A. J. Heath, M.B., Assistant Civil Surgeon, Poona, was appointed to act as Deputy Sanitary

Commissioner, Central Registration District, in addition to his own duties, from 23rd January to 7th February 1897.

The services of the undermentioned officers are placed temporarily at the disposal of the Government of Madras employment on plague duty, with effect from the dates on which they respectively assumed charge of their duties:—

Surgeon-Lieutenant E. M. Illington, I.M.S. (Madras).
Surgeon-Lieutenant F. D. Browne, I.M.S. (Madras).

The services of the undermentioned officers are placed temporarily at the disposal of the Government of Bombay for employment on plague duty, with effect from the dates on which they respectively assumed charge of their duties:—

Surgeon-Lieutenant-Colonel H. Hamilton, M.D., I.M.S. (Bengal).

Surgeon-Major J. I. Routh, A.M.S.

Surgeon-Major H. E. Deane, A.M.S.

Surgeon-Captain F. W. C. Jones, M.B., A.M.S.

C. M. Fleury, A.M.S.

A. F. W. King, I.M.S. (Bombay).

The services of the undermentioned officers are placed temporarily at the disposal of the Government of the Punjab, with effect from the dates on which they respectively assumed charge of their duties:—

R. W. H. Jackson, M.D., A.M.S.

S. P. James, I.M.S. (Madras).

Surgeon-Lieutenant P. Dee, I.M.S. (Madras).

The services of the undermentioned officers are placed temporarily at the disposal of the Government of Bombay for employment on plague duty, with effect from the dates on which they respectively assumed charge of their duties.

Surgeon-Major J. C. Culling, A.M.S.

Surgeon-Captain J. E. Brogden, A.M.S.

Acknowledgments.

JOURNALS RECEIVED.

Meet—British Medical Journal—The Practitioner—Edinburgh Medical Journal—American Journal of Obstetrics—Dublin Journal of Medical Science—Archives of Gynecology and Paediatrics—Manual of Gynecology and Paediatrics—Provincial Medical Journal—The Journal of the American Medical Association—New York Medical Journal—Medical Record, New York—Boston Medical and Surgical Journal—Times and Register, Philadelphia—Abstract of Sanitary Reports, United States—Occidental Medical Times—Merk's Bulletin of Advanced Medicine and Surgery—Medical and Surgical Reporter—The American Journal of the Medical Sciences—Medical Chronicle—Times and Register—Sanitary Record—Medical Press and Circular—La Tribune Medicale—La Reforme Medicale—Gazette Hebdomadaire—South Russian Medical Gazette—Archives Cliniques de Bordeaux—Gesundheitsrat—Montreal Medical Journal—Hygiene and Hygienic Gazette—Toledo Medical Compendium—Chirurgical Journal—Pacific Medical Record—Annales de La Polyclinique De Lille—United Service Gazette—Indian Medical Record—Indian Medical Reporter—Indo-European Correspondence—Indian Medical Chirurgical Review—O. Archivio Medico da India, Goa.

BOOKS AND PAMPHLETS RECEIVED.

Rough notes on Remedies. By Wm. Murray, M.D., F.R.C.P.
A Book for Every Woman. By Jane Walker, M.D.
Diphtheria and Antitoxin. By Nestor Thirard, M.D.
Vita Medica. Chapters of Medical Life and Work. By Sir B. W. Richardson.

COMMUNICATIONS RECEIVED.

Surg. ... Capt. J. Fayrer, A.M.S., Bombay—Surg. Capt. V. ... J. C. Vaughan, Punjab—Dr. Viegas, Bombay—Surg. Major T. H. Walsh, Midnapur—Surg. Major Ronald Ross, Bangalore—Surg. Capt. Bird, Calcutta—Surg. Capt. Moir, Calcutta—Dr. Kedar Nath Das, Calcutta—K. McLeod, M.D., LL.D., London.
Surgeon-Captain J. Herbert, Bombay; Surgeon Captain W. G. Pridmore, Blamo; Dr. Ram Dhari Sinha, Bombay; Surgeon Captain Heir, Hyderabad; Under Secretary; Government of India.

Original Communications.

THE PLAGUE PROPHYLACTIC.

BY W. M. HAFFKINE.

THE first condition to be fulfilled in carrying out a continuous work on a microbe is to be able to recognize it with certainty, and to distinguish it from all others which may come to be associated with or substituted for it in the course of the work. The following are the features for identifying the plague bacillus:—

Reaction No. 1.—Stalactite growth in Broth.

Broth inoculated with the plague bacillus is to be placed in a perfectly quiet position on an absolutely solid table or shelf, and observed undisturbed. The least oscillation will destroy the reaction.

24 to 48 hours after inoculation, the liquid remaining limpid, flakes will appear underneath the surface, forming little islands of growth. In the next 24 to 48 hours the flakes grow down in a long stalactite-like jungle, the liquid remaining clear.

In 4 to 6 days the islands of growth get more compact and solidified. If the flask is disturbed, then the islands will fall to the bottom in a sort of a snowfall, bringing down the stalactites, the whole growth getting deposited at the bottom. The islands, when solidified, do not get disintegrated even by violent shaking, whereas the stalactite are very fragile.

The appearance of the islands of growth underneath the surface is accompanied or preceded by the deposition of a residue on the sloped walls of the flask, and at the bottom, as well as by the appearance of a ring round the surface of the liquid.

Reaction No. 2.—Involution forms on Agar-agar.

The medium is not to contain glycerine, not to be of fresh preparation; to be partly dessicated, and to have the surface perfectly dry, shewing a good alkaline reaction.

The germs are to be inoculated abundantly, and preferably spread over the whole surface of the agar in a continuous layer.

Rarely in 24 hours, but as a rule in 3 to 4 days, the microbes will swell up and form large round oval pear-or-spindle-shaped or biscuit-like bodies, staining in the beginning well, afterwards shewing colourless, central regions, which extend gradually to the peripheric parts. The bacillus become unrecognizable, loses the appearance of a schizomycetic microbe and acquires that of a yeast cell or an alga. The swelling continues often to the extent of forming a body about 20 times larger in surface than the original bacillus. The power of staining is afterwards lost completely and the microbe appears finally in the shape of an unrecognizable dust spot.

These forms are not to be seen in liquid cultures, but I have discovered them in the tissues of inoculated rabbits and demonstrated them to the officer in charge of the *post-mortem* examinations, Surgeon-Captain Childe, who was afterwards able to trace their presence in human tissues in a perfectly certain manner. Their appearance in the tissues suggested at first the idea of modified blood corpuscles or disintegrated cells of tissue, or stained drops of albumen.

The prophylactic lymph.

The theoretical conjectures which led to the plan of preparation of the plague prophylactic were the following:—

The inoculation against cholera, made with bodies of Koch's comma bacilli cultivated on solid media appears to result in a reduction of the susceptibility and of the absolute mortality from the disease, but does not affect the case-mortality.

In the light of present information this seems to be in connection with the production, in the inoculated individual, of bactericidal powers, and not of antitoxic, as has been actually demonstrated to be the case by Pfeiffer and Kolle.

There is the possibility of the bactericidal power being created by the injection of the bodies of microbes, or substances enclosed in them, while antitoxic properties may be communicated by the injection of the metabolic substances secreted or produced in the surrounding media. This conclusion is only a hypothetical one, and taken as a temporary guidance in the work.

In the present instance I have decided to make an attempt at effecting both a reduction of susceptibility and of the case-mortality by combining in the prophylactic substance large quantities of bodies of microbes together with intensified extra cellular toxines.

I cultivate luxurious crops of plague microbes by adding to the nutritious media abundant quantities of fat exposed to rich aëration.

For the preparation of the prophylactic, I utilise the fat of milk in the shape of what is called in this country "ghee," which is clarified butter, used not pure but suspended in large flasks on the surface of nutritious fluids employed for cultivations of microbes generally.

The growth begins first of all underneath the drops of butter in the shape of flakes and stalactites described above, leaving the liquid limpid.

When the fluid is filled with a rich jungle, the growth is shaken off the drops of ghee and brought down to the bottom of the liquid, leaving the butter on the surface free to produce a second crop of growth.

In the course of a month half a dozen successive crops are thus obtained, which fill the liquid when shaken with an opaque milky emulsion.

The microbes in this fluid are killed by heat at 70° c. maintained for one hour.

In a quiet position, in test tubes, two different substances are then obtained—a perfectly limpid fluid and a thick white sediment.

Injected subcutaneously into animals they produce :—

(1) The sediment—a local inflammation and a nodule at the seat of inoculation accompanied with little fever or general effect; and

(2) The fluid,—a considerable rise of temperature and general affection, with no noticeable local effect.

On the 23rd of January, the plague broke out in Her Majesty's House of Correction, Byculla, Bombay, while the number of inmates was 345. Between the 23rd and 29th January, 9 cases with 5 deaths occurred. On the 30th morning 6 more cases took place, of which 3 proved fatal. In the afternoon 154 of the prisoners, belonging to the same batches as the rest, and living with them under perfectly identical conditions, volunteered to undergo the preventive inoculation and received each 3 c.c. of the mixture of sediment and fluid described above. One of these men had a swollen gland at the time of inoculation, and two of them developed glands in the same evening within a few hours after inoculation. These 3 cases proved fatal. From the next morning a difference shewed itself in the susceptibility and mortality of the inoculated when compared with the uninoculated, as is to be seen from the subjoined table :—

Date of occurrences.	Amongst non-inoculated.	Amongst inoculated.
23rd to 29th January 1897.	9 cases 5 fatal	.....
30-1-97, { Forenoon before the day of inoculation; inoculation. { Afternoon, after inoculation.	6 cases 3 fatal ... ..	..... 3 cases fatal.
1st day after inoculation, 31-1-97.	2 cases 1 fatal	1 case, recovered.
2nd day after inoculation, 1-11-97.	1 case fatal	.....
3rd day after inoculation, 2-11-97.	1 case fatal	.....
5th day after inoculation, 4-11-97.	1 case fatal	.....
6th day after inoculation, 5-11-97.	2 cases 1 fatal	.....
7th day after inoculation, 6-11-97.	5 cases 1 fatal	1 case, recovered.
Total after the day of inoculation.	12 cases, 6 fatal, in an average daily strength of 173 non-inoculated.	2 cases, non-fatal, in an average daily strength of 148 inoculated.

If repeated observations made in similarly precise conditions confirm the results in the Byculla jail, the plague prophylactic will appear to

influence the disease in men in a very advanced stage of incubation, the period of the latter being in the plague apparently between 2 and 7 days, whereas the prophylactic will appear to act in some 12 to 24 hours. The rapidity of its effect resembles the immunity produced in a few hours in animals, by injections of non-fatal doses of comma bacilli into the peritoneal cavity.

Between the 10th of January and the 6th May 1897, 11,362 individuals from the infected areas have been inoculated by the above process, with the following occurrences, which do not include those in the Byculla House of Correction detailed above :

Total Occurrences : 12, namely—

- in 3 patients who were already unwell at the time of inoculation ;
- in 3 patients who contracted the disease within 12 hours after inoculation ;
- in 2 patients who fell ill within 3 days ; and
- in 4 patients attacked 5 to 25 days after inoculation.

Attacks with Recovery : 33.

Figures relating to the general population are not yet available for an exact comparison with the death-rate from plague in the corresponding classes of non-inoculated ; a rough estimate, however, would seem to shew that the inoculated have suffered to an extent about 20 times smaller than the non-inoculated living under the same conditions and exposed to the same chances of infection.

BOMBAY ;
12th May, 1897.

REMARKS ON THE PATHOLOGY OF PLAGUE.

By SURGN.-CAPT. B. H. F. LEHMANN.

(Bring a Paper read at the Bombay Medical and Physical Society, May 7th.)

WHILE on the one hand the study of the pathology of a disease helps us to understand its nature, so, on the other, in order to be in a position to offer a satisfactory explanation of the changes—macroscopic and microscopic—which pathology reveals to us, it is necessary to study—clinically and otherwise—the methods by which it invades the body. Applying this as our text to the consideration of the pathology of plague, I shall endeavour to show from notes on a few cases and *post-mortems* that I have made how far the generally accepted view holds good that Kitchin's bacillus gains an entrance into the human body (i) by inoculation through a wound or abrasion either of the skin or mucous membrane; (ii) by direct inhalation into the lungs; (iii) by the digestive tract; and although I personally have not seen a case which could be satisfactorily explained *post-mortem* by this method of infection alone

(believing that, in most cases at any rate, a local inoculation of and not absorption by the intestinal mucous membrane occurs), I fully admit its possibility.

Firstly: Local Reaction after Inoculation through a Skin Abrasion.—The following case, although it never reached the post-mortem room, is nevertheless extremely interesting as it affords direct evidence by bacteriological research of local inoculation of, and local resistance by, the organism against the micro-organism. The patient, an Eurasian, aged 30, was admitted to the plague wards of St. George's Hospital on March 23rd with a history of 20 hours' illness, which began with a slight rigor, followed by nausea, frontal headache and fever. Twelve hours after he felt pain in the right groin and found a "bubo" there. His work had been house-to-house inspection, and he had helped in the removal of plague cases and the disinfection of the quarters in which they lived. On admission his temperature was $104\frac{1}{6}^{\circ}\text{F.}$, and he had those general symptoms of plague which it is not for me to enumerate to you who know them as well as I do. The points to notice are that his uppermost right femoral gland was enlarged to the size of a walnut, very painful on manipulation, quite free, and the skin over it normal. The other femoral glands on that side could be felt to be enlarged slightly, and were marked by tender but quite distinct from one another; further, on the outer side of the dorsum of his right foot we found a tiny scratch, and this was particularly noted—after some discussion with my nurses who regarded it as insignificant—by myself and the Assistant-Surgeon at the time. In three days these glands had become fused together into a large hard brawny mass, the size of an orange, and the patient's constitutional symptoms very severe—the temperature frequently being 105°F. , once nearly 107°F. ,—and the man himself in a continuous condition of low muttering delirium. Daily bacteriological examination of his blood was made. On the fifth morning after his admission I pricked a small bulla, which had been shewn me by the nurse the evening before, and which had developed on the identical spot where the scratch we detected on his admission had been seen, and inoculated an agar-agar tube with some of its serous contents, and at the same time I made another similar inoculation with a drop of blood taken from his finger. The results I obtained form the kernel of my story. On no single occasion did I obtain any growth from his blood, the agar-agar remaining perfectly sterile, while at my first inoculation from the serous fluid of the bulla on his foot I obtained a copious growth of plague bacilli (I pass round these two tubes, one taken from his blood, the other from his blister, for you to look at), and on the bulla reforming the next day I repeated my experiment and obtained the same results.

This case, I think, explains itself. The man was inoculated in the foot, and most of the bacilli passed to the femoral glands which proved effective barriers against their further progress. His marked constitutional symptoms were due to the absorption either of dead bacilli or of their toxin, or both from these localities; while the fact that no bacilli were at any time found in his blood shows, in my opinion, that the disease remained local, and the septicæmic stage was never reached. The reason why the bulla formed so late and at all lies in the fact that some few bacilli remained behind at the point of inoculation (the majority having passed up to the femoral glands), multiplied, and produced this local lesion whereby I was enabled later on to capture some of them and their offspring.

As a parallel to this case I draw your attention to that of a young girl who, on admission, had a cut on her left forefinger with typical general symptoms of plague, and an enlarged tender cubital gland at the left elbow. Three days later this patient, whose temperature had averaged 103°F. , had her left axillary glands painfully enlarged, and also her right femoral glands and spleen. I punctured all these glands (a proceeding I never do now as I consider it to be highly dangerous) and aspirated out some of her spleen-pulp in a hypodermic syringe, and made inoculations on separate agar-agar tubes, at the same time taking a similar preparation from her finger blood. My results (to quote from my notes) were these:—"All the tubes sterile except that inoculated from the left cubital gland." Here again, you see, another similar local process shewing local resistance and reaction of the organism against the micro-organism, and I could relate many more such cases, only time will not permit.

Secondly: Septicæmic Plague following Inoculation.—Here the process abovementioned spreads further; the power of resistance of the organism is lowered or may be but slight from the very first, and the bacilli become generalized throughout the body, reaching the blood either by the lymph-channels or in some cases by direct extension into the veins in or around the glands, and producing a true septicæmia. Such cases are almost always, if not invariably, fatal: I have only heard of one, in and from whose blood plague bacilli were found and cultivated, which is said to have recovered.

Case I.—That of a Hindoo male, aged 30, was brought into the Jamsetjee Jeejeebhoy Hospital, and died in a few hours on February 19th instant. History stated briefly that he had been ill three days, and little else was known about him. (As I helped in the autopsy I ask Professor Childe's permission to read an abstract of this case.) *Post-mortem* we found superficial enlargement of the glands of the right and left axillæ, neck, and groins. There were several scratches on the hands and feet. The glands in his right

groom were bigger than those elsewhere. On opening the body all the lymph-glands were found enlarged, especially the right femoral, right iliac, and the retroperitoneal and mesenteric, but none shewed hæmorrhagic infiltration. On the surface of the lungs, which were slightly congested, and at the apex of the heart were a few scattered petechiæ, very minute and difficult to see at first; similar tiny spots were found at the cardiac end of the stomach, but the intestine and other abdominal viscera were apparently free from them. Beyond cirrhosis of the liver nothing else noteworthy was observed in that organ, and although the kidneys, suprarenals, bladder, pancreas, testicles, pharynx, larynx and œsophagus were carefully searched, no lesions were discovered. The spleen, however, was enlarged to about twice its normal size, blue-grey on the surface, with a mulberry-like soft interior acutely congested, but yet with a marked increase of fibrous tissue in its stroma, thus shewing the enlargement was not wholly due to recent changes. Bacteriologically, Dr. Bitter found and shewed me Pest colonies on agar-agar from the spleen, right femoral and mesenteric glands, and blood. Most colonies were obtained on those cultures taken from the spleen and femoral glands. Here we have acute plague, causing little more than simple enlargement of all the lymphatic glands, ending fatally by a septicæmia.

Case II.—An European, aged 45, was brought to St. George's Hospital with a history of eleven hours' illness, which began with a rigor and was followed by frontal headache, fever, nausea, and great depression, and the development of a painful lump just below the jaw on the right side of the neck, which rapidly enlarged. On admission, I found—besides the usual signs of plague—the lymphatic glands over the right parotid and submaxillary glands much enlarged, very painful, and embedded in considerable œdema. The inguinal glands on both sides were also enlarged and painful. He had many acne-like spots and pimples on both sides of his face and neck, but neither a sore on his penis nor gonorrhœa; and no scratches were discovered on his hands or feet. The case terminated fatally, 36 hours after admission, by spreading of the œdema upwards all over the right side of his neck and head, and downwards over and under the clavicle on to the chest and into the axilla; and by similar implication of the glands on the left side of the neck, pressure was caused on his trachea, stridulous and gasping respiration (simulating diphtheria) followed, and death occurred practically by simple suffocation. Ten hours before death one could not feel his trachea at all, so marked was the œdema over it. An agar tube which I inoculated with some of his finger blood 18 hours before death yielded nothing but a crowd of pure Pest colonies.

The post-mortem examination, which was made four hours after death, revealed the following state of things. Bright-red subcuticular motting (which the Sister informed me came on as the man was dying, and which I found quite distinct from that seen over his buttocks and limbs due to *post-mortem* changes) extended all over the back and right side of his neck, from the top of his head above to below the level of the 4th rib in front, 7th rib in the axilla, and over the right scapula behind. The swelling over all this area was very great, most marked in the neck and axilla, pitting deeply on pressure. There was considerable œdema on the left side of the neck also, but not nearly to the same extent, nor was the skin so discoloured, as on the right side. Many bright-red petechiæ were seen on the back and front of both elbows. The conjunctivæ were injected throughout, shewing many small petechiæ, but the mucous membrane of the nose, lips and gums was blue-red and cyanosed. The parotid, submaxillary and axillary glands on the right side felt enormously enlarged, and the other superficial glands to a less degree. On opening the body, a diffuse subcutaneous and intra-muscular hæmorrhagic œdema, not visible from without, was found extending from the angle of the ribs to the umbilicus, most marked on the right side in the substance of the rectus muscle. In the parietal peritoneum were a few scattered petechiæ on the right abdominal wall, while more were found in the visceral layer over the cardiac end of the stomach. The liver was much enlarged, shewing early hypertrophic cirrhosis, with here and there petechiæ and pale yellow superficial necrotic and fatty patches on its upper and lower surfaces. The gall bladder was distended with dark tarry bile and showed numerous minute petechiæ in its walls and mucous membrane. The spleen was enlarged to thrice its size, congested and hæmorrhagic throughout, and shewing many petechiæ in its capsule. Section revealed a dark-red soft mulberry-like pulp, very œdematous and friable. *Kidneys*: hæmorrhages in great number in the capsule, surrounding areolar tissue and on the surface of both organs, which were much enlarged; the capsules quite loose; the cortex increased and pale, with innumerable minute petechiæ, the pyramids standing out in striking contrast, dark-red and congested; a few scattered petechiæ in the pelvis. The *ureters* appeared normal without and within. The *suprarenal bodies* were enlarged and hæmorrhagic; in the *pancreas* nothing noteworthy. The walls of the *stomach* were much thickened, soft and œdematous, with many scattered petechiæ in the visceral peritoneum at the cardiac end. The mucous membrane was congested, bright-red in blotches, and small hæmorrhages were seen in its substance, especially at the cardiac end: the rugæ stood out very prominently. Numerous petechiæ and patches of congestion were noted in the

intestine, mostly in the ileum and transverse colon. Peyer's patches were prominent and very slightly hæmorrhagic in parts, and the solitary glands were much swollen. The bladder was distended with $\frac{3}{8}$ of clear urine; its wall thickened and œdematous, and its mucous membrane congested.

On opening the chest, clear serous fluid was found in both pleural cavities—about $\frac{3}{4}$ in each, and about $\frac{1}{2}$ in the pericardium. No hæmorrhages on the parietal pleura, but on the visceral layer over the front of the lower lobe of the right lung were ten to twelve small ones, irregular in shape and position. Both lungs were congested and œdematous, especially at their bases, and frothy bloody exudation oozed out on section.

The parietal pericardium was free from petechiæ and hæmorrhages, though many of both were seen in the visceral layer at the apices of the ventricles, back and front. The right heart was dilated, and its muscle very soft: the left side was slightly hypertrophied; and both contained much white and red clot lying in dull dark-red blood which was extraordinarily thin and liquid. The endocardium appeared natural. The larynx shewed enormous œdema glottidis, which was as big as a chestnut on the right side, and completely closed up the entrance. The whole mucous membrane was œdematous and congested, and much sero-mucous frothy exudation was found in both larynx and bronchi.

On dissecting up the neck, the bloody œdema was so marked that the cricoid cartilage was more than two inches below the surface, and the thyroid gland could hardly be made out, so soft and pulpy did it feel. Quite two pints of this bloody-serous fluid ran out on to the table as the dissection was being done.

The Lymphatic Glands.—Those over the right submaxillary and parotid glands, as well as those glands themselves, were increased to the size of a large mango, spongy, dark-red, œdematous and hæmorrhagic, both on surface and on section, and had fused into one another, involving also the right cervical glands which were hæmorrhagic, matted together into a huge sausage-shaped mass, practically continuous with the similarly affected right axillary glands below. No set could be cleanly dissected out, the bloody œdema in this situation involving everything. The right carotid, jugular, axillary, subclavian veins and their branches were found imbedded in a mass of gelatinous glandular tissue, and directly infiltrated by hæmorrhage from without inwards, all their coats, where the glands had been in direct contact with them, being stained dark-red; and while but little of their course appeared lighter in colour, none looked normal. On the left side the parotid, submaxillary, and cervical glands were hæmorrhagic to a far less degree; and the œdema was rather serous than bloody. All the other glands of the body were enlarged, very congested on the surface and dis-

tinctly hæmorrhagic on section. Unfortunately the skull was not allowed to be opened, and so no examination of its contents could be made. *Bacteriological Examination* showed crowds of Pest colonies on agar inoculations made from the œdema in the neck, heart's-blood, cervical glands, and spleen. In the bronchial exudation mostly streptococci were seen. Two mice inoculated with the Pest cultures so obtained died in 48 hours, and Pest bacilli were recovered from their spleen and blood. I am indebted to Dr. Bitter of Cairo for his kindness in allowing me to help him in the bacteriological examination of this case.

Here we have what I have learnt to call the hæmorrhagic form of plague septicæmia—an acute extension occurring straight through the vessel walls from the glands in the neck, while resistance in those glands was but slight. It is probable that the primary inoculation was through one or more abraded acne spots on this patient's face.

Another variety of plague septicæmia is occasionally seen, in which *post-mortem* one finds nothing more than perhaps only a few minute petechiæ, which might easily be overlooked; or slight glandular enlargement without any marked hæmorrhagic infiltration; and yet crowds of Pest colonies can be grown from the blood and spleen.

Thirdly: The Pneumonic variety of Plague following Invasion of the Lungs.—As this variety has already been described by Professor Childe in the interesting paper he read at our last meeting, I shall do no more than lay stress upon the two forms in which it may occur. Plague may invade the lung alveoli from without, the bacilli being breathed in, in which case we may call it "*Primary Plague Pneumonia*," or it may involve the lungs amongst other organs during the course of the septicæmic form, in which case we have "*Secondary Plague Pneumonia*." It is most important to distinguish between these two varieties. In both of them Pest bacilli are found in the sputum, but in the former they are present practically from the very first in that thin characteristic muco-serous sputum which may or may not be coloured a faint pink throughout from the presence of blood, as well as in the viscid bloody matter which may be expectorated later; whereas in the latter they are not seen until hæmorrhages or infarcts of Pest have occurred in the true pneumonia or other complicating lung trouble, when the bacilli can be found in the sputum which is characteristic of the local disease from the very first. Further, just as ordinary pneumonia may be lobar or lobular, so may the lung invasion by Pest bacilli take either form, although the lobular variety appears to be the more common. During life, in primary Pest pneumonia the onset of the disease may be somewhat insi-

dious: general clinical symptoms develop late or hardly at all: the tongue cleaner, and the pulse and even respiration rate lower at first than what one would expect in such an acute lung affection, or indeed finds in ordinary Fräukel's pneumonia. On the *post-mortem* table, in death from the former very few glands except the bronchial glands are found involved, unless the case has lasted some days, when others will be involved by the extension of the disease from a local to a general process; but in death after secondary plague pneumonia general glandular enlargement with its characteristic signs is almost invariably seen.

Fourthly: Invasion by Absorption from the Alimentary Canal.—Although I have frequently seen the mesenteric glands enlarged, I have not yet seen a case in which they alone were enlarged, or in which I could find any definite local intestinal lesion proving that absorption had taken place in the alimentary canal. The most marked instances of congestion of the stomach with hæmorrhages and petechiæ, and similar lesions of Peyer's patches and other intestinal glands that I have seen have been in those cases where I have been able to trace other points of inoculation, and to a certain degree watch the spread of the disease in the body before death. On the other hand, this is quite a likely method of invasion, and should not be forgotten as a possible one.

In trying, Sir, to give examples of the methods by which Kitasato's bacillus invades the body producing plague, I have indirectly touched upon one of the most important means of its spread, and that least likely to be generally sought for, although Professor Childo has laid great stress upon it, namely, the sputum in the pneumonic cases. From their habit of sleeping on the ground, using their hands as spittoons for the sick to spit into, and other similar traits, natives are very likely to be infected with Pest by the lungs.

The moist or recently dried (but still virulent) bacilli from the sputum and in many cases from the pus of the buboes, or even blood either by itself or in the urine or feces as well, may gain an entrance into the human body.

My belief is that local inoculation through the skin is the most common mode of invasion in Pest, especially in the poorer class natives, whose hands and especially whose feet are nearly always covered with cuts and scratches. We know that the minutest abrasion will serve for the entrance of so tiny a foe; and I can only say concerning statements that "not more than 5% of the cases show traces of direct inoculation," that I myself, and others, have had a very different experience even in some of the very same cases. Once the bacilli gain an entrance into the body they pass onwards along the lymph-channels, and the question of their ultimate fate and distribution lies be-

tween their own virulence and the powers of resistance, local and general, possessed by the organism. That some attempt at resistance locally is practically always made is shown by the congestion and painful enlargement of those lymph-glands, whether superficial or deep, which lie nearest or approximately near the point of inoculation. (In those cases where the nearest glands appear to be unaffected, but others farther on suffer, the explanation probably is either that those glands did not offer sufficient resistance as a barrier or filter to the progress of the bacilli, or that the bacilli themselves were so virulent as to readily overcome this resistance.) And thus the bacilli may pass from one set of glands to another until they finally get into the ultimate lymph-vessels, and in this manner be conveyed into the bloodstream; or they may gain an entrance directly into the veins, as in the hæmorrhagic case I have related, by direct extension through the vessel wall. On the other hand, they may remain locally and die, setting free their toxin, which will produce the clinical symptoms with which we are all familiar: and later on the glands where they have lain may break down under the continued strain of resistance and suppurate, or perhaps, if the process be less severe, they may undergo resolution. If suppuration ensues one does not always find Pest bacilli in the pus even at the moment of opening the abscess, and the reason for this appears to be that the bacilli have died and so cannot develop colonies on culture media; but one often does find them, especially if the bubo be opened as soon as pus fluctuation is detected, and hence many consider it to be a safer plan to wait until the process of pus formation is well advanced before opening the buboes,—an opinion with which I myself am inclined to agree. In some few cases, instead of Pest bacilli being found in the pus of these buboes, streptococci are discovered. The explanation of this occurrence is not so easy; but it may be that a secondary inoculation has taken place; and indeed, in a few cases examined *post-mortem* I have seen both Pest bacilli and streptococci obtained from the pus of the same gland.

It may be argued that the initial rigor in plague is due to a direct invasion of the bloodstream by the bacilli, but I must say I cannot see why this should be regarded as a *sine quâ non*. That it may undoubtedly be the true explanation in acutely fatal cases I fully admit, but in non-fatal cases, or in those in which a local reaction at first occurs and persists for some time before the general septicæmic stage is reached, I believe the initial rigor to be due to absorption of toxin from the local primary area or areas; and, as a parallel instance, I point to M. Haffkine's system of inoculating dead Pest bacilli with their toxin under the skin, where initial rigors, occurring a few hours after

the inoculation, are fairly common, and even later glandular enlargements not so very rare. Further, in an ordinary typical Fränkel's pneumonia which goes on to recovery, one sees an initial rigor of great severity, and this in a case where the micro-organisms are certainly quite local at first and remain so.

I must apologize, Sir, for the length of my paper, but the importance of the subject is the excuse I beg to offer.

A REPORT ON THE EPIDEMIC OF BUBONIC PLAGUE AT HONGKONG IN THE YEAR 1896.*

BY STAFF SURGEON WILM OF THE IMPERIAL GERMAN NAVY.

(Continued from page 171.)

II.—PATHOLOGICAL ANATOMY.

THE material from which the following account is derived consisted of 867 bodies. In 20 of these the head, thorax, and abdomen were all opened; in 150 the thorax and abdomen only; while in the remainder the buboes merely were incised, or the abdomen opened, in order to confirm the diagnosis.

The bodies did not as a rule show any considerable degree of emaciation. There was no marked tendency to decomposition. The expression of the countenance was calm. Rigor mortis was moderate in degree.

In the skin, petechiæ were sometimes found, and carbuncular swelling up to the size of a crownpiece. When the carbuncles were incised, the cutis was found to be thick, hard, and dense, and the subcutaneous tissue the seat of hæmorrhagic infiltration.

The cerebral membranes were always congested, and the sinuses filled with dark-red blood. The pia-mater was cedematous; and in most cases was clouded, especially along the vessels, by a grey, gelatinous exudation. Small ecchymoses were scattered here and there in the pia-mater.

The brain-substance showed often moderate cedema and numerous *puncta vasculosa*. The cerebral ventricles sometimes contained a small quantity of fluids.

In the pleura, there was as a rule no change. In rare cases small hæmorrhages were seen in the membrane, with a moderate effusion into the pleural cavity. In most of the cases in which these appearances were found there were large axillary buboes on the affected side, with hæmorrhagic infiltration of the surrounding connective tissue. In one case, as the sequel of a pulmonary abscess, there was found a large purulent effusion in the left pleural cavity.

The mediastinal glands were sometimes enlarged up to the size of a bean, and of a blue or

bluish-red colour. In one case, in the mediastinal connective tissue behind the sternum, there was an abscess of the size of a hazel-nut.

The lungs were as a rule much congested and very cedematous, the lower lobes especially so. From the cut surfaces, frothy red fluid could be squeezed. In 170 autopsies there was one example of abscess in the left lung; and in five cases pneumonic infiltration was found in the lower lobes. The bronchi and the larynx usually showed no morbid change, except that the mucous membrane sometimes appeared red or slightly cyanotic, and was frequently covered with mucus. The bronchial glands were often moderately enlarged up to the size of a bean, and of a red or bluish-red colour.

The pericardium, especially the visceral layer, showed frequently petechiæ or ecchymoses. Fibrinous pericardial exudation was observed in one case. In no case was any considerable increase in the quantity of pericardial fluid met with. The heart, especially the right side, was always somewhat distended with blood. The heart-muscle was in most cases pale and flabby, the parenchyma cloudy or in a state of fatty degeneration. The blood in the cavities was of a dark-red colour, and was either coagulated to form soft clots, or in a semi-fluid state.

The great venous trunks of the thorax and abdomen were distended with dark-red blood.

In the omentum and peritoneum and beneath them, small or large extravasations of blood were frequently met with.

The spleen was always enlarged, often from two to four times its normal size. Its consistence was sometimes soft, sometimes hard. It was usually hyperæmic, and of a bluish-red colour. Hæmorrhages were sometimes to be seen in the parenchyma immediately beneath the capsule. On the cut surface numerous small, white, overgrown follicles were visible.

The kidneys were usually enlarged, much congested, of a dark-violet colour, and frequently showed small ecchymoses on the surface. The stellate veins were plainly visible. The cortical substance was often thickened, the parenchyma cloudy or in a state of fatty degeneration. The mucous membrane of the renal pelvis very often showed numerous small hæmorrhages. The pelvis often contained small coagula, which extended into the ureters.

The peri-renal connective tissue frequently contained large extravasations of blood, of a dark-red or blackish tarry colour, which sometimes extended downwards into the true pelvis.

The urinary bladder was sometimes contracted, sometimes greatly distended. The mucous membrane sometimes showed punctiform ecchymoses. The urine in some cases contained blood.

The uterine and its appendages showed frequently small hæmorrhages in the mucous membrane.

* Translated for the Government of Hongkong by Maurice Eden Paul, M.D.

The liver was usually enlarged, of a brownish-red or greyish-red colour, and of a firm consistence. In many cases smaller or larger extravasations of blood were found under the capsule. The parenchyma was often cloudy.

The boundaries of the lobules were often ill-defined, and the intra-lobular vessels were as a rule filled with blood. In some cases, in which during life there had been ieterus, the liver was of a greyish-yellow colour. The gall-bladder was frequently enlarged, and tightly distended with dark-green bile; its walls were sometimes oedematous.

The stomach was often contracted. The mucous membrane was sometimes whitish-grey; more commonly, however, markedly hyperæmic, especially at the summits of the folds, and thickly covered with mucus. Petchiform blood-spots and hæmorrhagic erosions of the size of a lentil, in great numbers, were of frequent occurrence in the mucous membrane. The contents of the stomach consisted often of brownish-black masses.

The whole intestine was as a rule markedly hyperæmic, was often contracted, and usually contained bile-stained masses. The mucous membrane was often thickly coated with mucus; and showed in most cases small hæmorrhages and ecchymoses, which were most commonly situated on the summits of the folds.

The solitary follicles were in nearly all cases more or less swollen, especially in the lower part of the small intestine, and often attained the size of a pea or a bean. The Peyer's patches also were almost always enlarged, and raised above the surface of the membrane. The patches were frequently denuded of epithelium, and were often the seat of ulcers with undermined walls but free from sloughs. Hæmorrhages in the Peyer's patches were also observed in many cases.

In the mesentery, in many cases, there was extensive extravasation of blood. The mesenteric and the retro-peritoneal glands were in nearly all cases affected in more or less considerable degree. They were enlarged up to the size of a bean or a hazel-nut, and were either whitish in colour, or, more commonly, in consequence of a considerable degree of hyperæmia or hæmorrhagic infiltration, they were dark bluish-red. In about 60% of the cases the mesentery was thickly studded with glands of all sizes and degrees of inflammatory change. The mesenteric and retro-peritoneal glands were sometimes surrounded by extravasated blood, and were frequently in a state of inflammatory softening. The blood and lymph vessels between the affected glands and the intestine were in most cases dilated, and of a blue or bluish-red colour. In those cases in which no external buboes had been formed, the changes in the intestine and the stomach, together with those in the mesenteric and retro-peritoneal glands, constituted the most conspicuous morbid appearances.

The pancreas was usually hyperæmic, but showed no other morbid change.

The mucous membrane of the pharynx was generally dark-red. The tonsils were sometimes enlarged and dark-red.

The sub-maxillary glands showed no change beyond slight hyperæmia.

The parotid glands were sometimes swollen and markedly hyperæmic.

In the sub-lingual glands, with the exception of slight hyperæmia, no morbid change was found.

In the external lymphatic glands the morbid change was usually much more extensive than in the internal. The outwardly visible buboes consisted in the first place always of the swollen lymphatic glands themselves; and in addition in many cases of the surrounding connective tissue, oedematous or infiltrated with blood. In the latter case, through the matting together of the glands and the surrounding tissue, there arose diffuse swellings of the size of a hen's egg up to that of the fist. In the buboes, the parenchyma of the glands was sometimes uniformly red, or of the colour of wine-lees, or violet, or brownish-red, and either firm or soft in consistence; sometimes whitish or marbled, and of the consistence of marrow or brain, or firmer like lard. Frequently small purulent foci were seen in the glands. The swelling of the glands was due to hyperæmia, exudation, hæmorrhage, and hyperplasia of the cells. The distinction between cortical and medullary substance could not usually be recognized. In the inguinal buboes, the glands superficially placed in front of the femoral vessels were much less affected than those lying deeply in Scarpa's space. These inguinal and femoral buboes extended usually, but not always, through the crural canal into the pelvis. When this extension occurred the iliac and lumbar glands were similarly affected to the femoral glands, and often formed great, compact masses of swollen lymph-glands, surrounded by extensive extravasations extending on one or both sides of the spine up to the diaphragm. In these glands also small abscesses and more extensive suppurations were sometimes found. Not infrequently, moreover, the iliac glands showed much more swelling and change than the inguinal glands. Most commonly the vascular and lymphatic trunks in the neighbourhood of the affected glands were found much dilated and inflamed. If the cervical glands were the seat of the disease, the inflammation often extended, amid surrounding blood-extravasation, to the mediastinum, and frequently also to the axilla. And conversely, the inflammation often extended from the axilla into the neck.

In addition to the developed buboes, in other parts of the body, especially in the axillary and inguinal regions, the glands were always more or less reddened from congestion, and swollen up to

the size of a bean or a hazel-nut. This was found to be the case in the bodies of those also in whom during life no definite buboes had been formed.

The termination of the glandular swelling was as follows: The large, painful glandular swellings, accompanied by inflammation of the peri-glandular tissue, underwent suppuration in 90% of the cases. The suppuration originated either in the gland-substance itself, by the formation of small abscesses, or else, after necrosis of the glands, in the surrounding connective tissue. The other glandular swellings underwent resolution by absorption of the inflammatory products, but in these cases indurations and enlargements were usually left behind.

According to the pathological anatomy, bubonic plague is a disease characterised by inflammatory swellings of the external and internal lymphatic glands, and especially of the intestinal glands, by great enlargement of the spleen, by parenchymatous changes in the liver and kidneys, by inflammation of the cerebral membranes, and by the production of hæmorrhages.

III.—MICROSCOPICAL AND BACTERIOLOGICAL APPEARANCES IN BUBONIC PLAGUE.

The Plague Bacillus.

In Hongkong, in the year 1894, Kitasato and Yersin discovered a bacillus in the buboes, the blood, and the organs of those that had died of bubonic plague, and also in the blood of patients suffering from the disease. When various animals (mice, rats, guinea-pigs, rabbits) were inoculated with pure cultures of this organism, they suffered from a disease similar to bubonic plague in man. Since that time this bacillus has therefore been regarded as the cause of the disease. In my own researches, by microscopical examination and by culture experiments, I was able in cases of plague to demonstrate the presence of the same bacillus.

A.—MICROSCOPICAL AND BACTERIOLOGICAL APPEARANCES.

On microscopical examination the bacillus was found in fresh bodies (two to fifteen hours after death) in great numbers in the spleen and the buboes; in small numbers in the affected lymph-glands, in the lungs, heart, liver, and kidneys, in the walls of the stomach and intestine, and in the blood. The bacillus was, moreover, frequently seen in the interior of the corpuscles.

By culture experiments with material derived from fresh bodies, the presence of the bacillus could be demonstrated in the affected glands, in the spleen, liver, and kidneys, in the walls of the stomach and intestine, and in the urine and the feces.

In older bodies, in which decomposition was not too far advanced, the bacillus could also be

found on microscopical examination in the affected glands and in the spleen.

In addition to the plague bacillus, staphylococci could, in some cases, be found in the affected lymphatic glands, in the blood, in the kidneys and the urine, and in the liver and the spleen. In the buboes, cocci were very frequently present, and sometimes also the *bacterium coli*.

The microscopical examination of the blood of 273 patients suffering from plague showed in 212 cases (77%) an increase in the number of the white corpuscles. Bacteriological examination showed in 221 cases (81%) the presence of plague bacilli in small numbers. Shortly before death, and in severe cases, the examination of the blood for bacilli was most frequently successful. In 20% of the cases examined, staphylococci were found in addition to the plague bacilli, most commonly the *staphylococcus pyogenes aureus*. In quite exceptional cases, streptococci also were found in the blood.

In the pus, from freshly-opened buboes, small numbers of plague bacilli were usually found, in addition to pus-cocci, especially the *staphylococcus pyogenes aureus*, and sometimes also the *bacterium coli*. Sometimes, however, the pus was sterile, and this was especially the case in suppurating buboes of long duration. In the necrotic glandular masses found in the buboes, the bacillus was usually met with in large numbers.

In the blood from punctured buboes, the presence of the plague bacillus could always be demonstrated by microscopical and bacteriological examination.

In the expectoration, especially when bloody, of 20 patients suffering from bronchitis, the plague bacillus was found on bacteriological examination in 18 cases.

In the saliva, the bacillus was found in 14 out of 18 patients suffering from plague. In the vomit, the presence of the bacillus was demonstrated in 18 out of 20 cases examined.

(To be continued.)

METHODS OF MALARIAL INFECTION.

By SURGEON-MAJOR J. H. TULL-WALSH.

In this article I wish briefly to consider the vehicles by means of which the malarial parasite obtains entrance into the human body. The word *malaria*, bad air, at once suggests the first and most common method of infection by air inhaled into the lungs, through the delicate membranes of which the *plasmodia* find easy access to the blood-vessels. The physical power of the sun which draws up the vapour of water, causing evaporation, is sufficiently strong to draw up with it numerous organic bodies such as *amœbæ*, etc. These will, however, tend to lie most thickly in the strata of air nearest the surface of the locality from which they arise and as they live in the mud among decaying vege-

table matter they will be thickest over such parts of marshy areas as are but partially or periodically covered with water. During the day many of these organic bodies are no doubt carried off by currents of air, and they also probably die in enormous numbers from the effects of great heat. At night the strata of air for varying distances above the surface of the marsh become cool and condensed; the watery vapour then contains relatively large masses of *plasmodia*, and hence the danger of breathing this moist night air.

The heat of the sun during the day warms this heavy poison-laden air which now rises in currents or even strong winds according to the physiography of the district. These winds will bear the malarial poison along valleys and plains horizontally, or obliquely along ravines and rifts in adjacent hills becoming a source of danger to dwellers at some distance from the original home of the malarial parasite. In certain parts of the earth, notably in the tropics, the winds are of a regular and seasonal character. Thus we see that a site which might be fairly healthy at one time of the year might be very unhealthy at another period when the wind is blowing towards it from a marsh, desert or water-logged heavy soil in which *malaria* abounds. The horizontal distance over which the infection may be carried across water varies considerably, and in many cases cannot be very great since European dwellers in Africa and India frequently escape from malarial diseases when able to sleep on vessels some few hundreds or a thousand feet from the land. The horizontal spread over water as ascertained at the time of the Waleheren Expedition was 3,000 feet, but this cannot be accepted as usual or universal. About two miles may be taken as the outside limit to which the malarial poison can be borne from a tainted spot over healthy country. Within this limit the spread over land or water will vary with the strength of the winds. On land, ranges of hills, belts of trees and blocks of buildings tend to check the spread of *malaria*, and especially check the onward movement of the lower strata of air which, as I have already stated, contain the most poison.

The upward limits to which the germs of *malaria* may be borne also vary considerably, and the following table of *safe elevation* is given from Parkes' *Practical Hygiene* :—

Italy	...	400 to 500	feet.
America (Appalachia)	3,000		"
California	..	1,000	"
India	...	2,000—3,000	"
West Indies	...	1,400—1,800 to 2,200	"

The figures in this list are, I am sure, too low for Italy and India. For the latter, I should put the limit of *safe elevation* at 5,000 feet.

As regards India and other countries, isolated cases of *malarial fever*, found in mountainous areas, do not necessarily disprove the general

freedom from infection in high altitudes. The disease may have been contracted during a visit to the neighbouring valleys and lowlands.

It must be remembered, also, that marshes and centres of infection may exist on high plateaus or among hills. The explorer Stanley* states that his people were attacked by *malaria* at a height of 2,000 feet on the Nyanza plateau and also at Bavikai, where the average level is over 4,500 feet; he concludes, therefore, that in the country through which he passed there is no safety from *malaria* from 0 to 5,000 feet. The same observer points out that his followers suffered most when meeting the wind—a fact of no small interest.

The next method of infection is through water used for drinking purposes. In this vehicle the *plasmodia* gain entrance into the intestinal tract and from thence make their way into the circulation. In certain cases of dysentery and diarrhoea active *amæbæ* are found in the 'stools,' and similar low forms of life may be often seen in the 'stools' of healthy animals, such as the cow and the pig. *Amæbæ*, too, have been found in certain abscesses of the liver, and these must have arrived there from the intestinal tract. The presence of the *coccidium oviforme* in the liver of rabbits affords us another example of the way in which such organisms may enter the system by way of the digestive canal.

That water is one of the chief vehicles by which the *plasmodium malarie* is conveyed into the system I am fully convinced from experience. Even Hippocrates noted that those who drank the water of marshy lands suffered from enlargement of the spleen, and many striking and unimpeachable instances are quoted by modern authors.† The evils of impure water in malarious areas are easily recognised by the inhabitants, and I am informed by a gentleman, who spent some time in the neighbourhood of Delagoa Bay, that the merchants in Lorenzo Marques, knowing the danger which attaches to the drinking of the local waters, make their European clerks and assistants "wine allowances."

North was not entirely in agreement with those who hold the opinion that malarial infection is conveyed by drinking water. In his lectures‡ he states that the healthiest part of Rome is supplied with water—aqua di Trevi and aqua Vergine—which rises "on unenclosed land in springs which bubble up and cover the surface in a locality so unhealthy that to pass several nights there in August might involve risk to life and certainly to health." It seems probable that we have here merely a confirmation of a fact, namely, that spring water in malarial districts may often be free from the *plasmodium malarie*, and not a refutation of the views supporting the general belief.

* *Darkest Africa*, ii, 32.

† Parkes' *Hygiene*, 8th Ed., 63--65; Laveran's *Traite*, 459.

‡ *British Medical Journal*, 1887, 931.

DYSENTERY IN BENGAL JAILS.

By SURGN.-CAPT. W. J. BUCHANAN, B.A., M.B., DIP. ST. MED.,

Superintendent, Central Jail, Buxar.

(Continued from page 179.)

THIS is the form of dysentery to which I would restrict the term "specific." It is this form which is probably due to one or other of the microbes to which bacteriologists attribute the disease. It is this form of dysentery which is probably sometimes followed by liver abscess,* and it is against this form that the usual jail measures of disinfection and burning of stools are directed. Such cases, unless they quickly respond to treatment, pass into an acute sloughing stage, in which large portions of the intestine are involved, and more or less large quantities of very offensive rotten-oyster-like sloughs are passed. In fatal cases the *excreta* become black or dirty—brown in colour due to decomposed blood, the patient at the same time passing into a collapsed typhoid state, accompanied by delirium, involuntary evacuations, and followed by death.

We now come to the third form of dysentery which is commonly but perhaps inaccurately called "chronic dysentery." Every medical officer knows the kind of case meant. It is to this class of case that the jail mortality from dysentery is very largely due. The mild and acute forms of dysentery are amenable to treatment, but the form to be now discussed though not hopeless is extremely tedious and disappointing. This form is closely akin to or identical with the dysentery met with in famine times, and examples can always be seen at any hospital on the Pilgrim Road to Puri in the wards too truly called "moribund."

What is this condition? It appears to be sometimes the result of an "acute" attack of dysentery which has not responded to treatment or has been neglected as often seen among cases applying at dispensaries for relief, but in my experience it is more often the result of profound malarial poisoning, scurvy or tuberculosis. In such cases an attack of dysentery results in leaving the colon more or less studded with ulcers which will not granulate nor cicatrize, and which are kept open by peristalsis, passage of feces, indigested food, &c. I cannot look on such cases as being in any degree "specific," it is the colitis or ulcerated condition of the colon and the degenerated condition of the mucous membrane which we have to treat. In such cases we find attacks of

diarrhœa alternating with exacerbations of a more 'dysenteric' type. The diarrhœa is often of the frothy kind, suggestive of fermentation of the food in the intestines, this is followed by intervals of apparent quiescence or of actual constipation,* upon which supervene, in a few days, stools consisting of serous exudation mucus, blood and pus-like matter.

When such cases are met with, it will often be found (in my experience) that there are symptoms pointing to the condition known as malarial cachexia, in which we find some or other of the following symptoms, anemia, seen in the mucous membranes, œdema of the feet and ankles, it may be ascites, a pale sickly or bronzed ashy colouration of face, yellow jaundice-like conjunctivæ, irregular attacks of fever, full swollen belly, tympanites, sometimes albuminuria, spongy blue-black or ulcerated gums, and the molar ulcer of Crombie. The tongue in the earlier stages is pale, and marked by black pigimentary deposits, or presents an abnormally red and raw appearance with bright patches bared of epithelium or it may be slightly furred, flabby, and indented. A similar condition is found as a result of chronic hill or white diarrhœa, and has been described by Dr. Thin of London, as if it were a separate disease, under the name of psilosis. In the early stages the patient complains of "night fever," flatulence, indigestion, nyctalopia, and if a prisoner it will be found that he has been steadily losing weight. The spleen is usually enlarged, and *post-mortem* the liver is found in a stage of cirrhosis, or more or less deeply pigmented.†

It is not, however, in malarious cases alone that this form of "chronic dysentery" is found. In many cases I have found evidence of tubercular disease of the lungs. In one unhealthy period in the Central Jail, Midnapur (1892-3) I found a number of cases in which the predominant symptom was that of dysentery, but in 22 such cases, there was ample *post mortem* evidence of tubercle of the lungs (v. I. M. G. for 1893 and Bengal Jail Administration Report, 1893). It is not to be imagined that there is any necessary connection between dysentery and tuberculosis, but I maintain that so-called chronic dysentery is sometimes only an episode and frequently the terminal one, in a case of

* On *post mortem* examination, it may be after weeks of chronic diarrhœa and dysentery, it is often found that the small intestines are loaded with fecal matter. The explanation appears to be that the ulcerated condition of the great intestine has caused contraction of the bowel or, it may be, spasmodic closure of the ilco-coecal valve. We have therefore at times constipation followed by diarrhœa in the intervals of the dysenteric attacks. This explains the use of occasional doses of castor oil or of an enema in such cases.

† It is to be regretted that the term "malarial cachexia" has been left out of the new edition of the nomenclature of disease. How are we to call such cases as above? To return a case of malarial cachexia as "ague," "remittent fever," or even as "enlargement of the spleen" is surely misleading!

* As liver abscess has been mentioned it is worth noting how rare this disease is among prisoners though dysentery is so common. A mere history of having had dysentery in a case of liver abscess in a native patient is of little importance. dysentery is so common among them that "few escape it" (as Mark Twain said of the Legion of Honour), so unless the case is accompanied by bacteriological proof as in Surgeon-Major Leahy's case (*Lancet*, vol. i, of 1895, p. 927) the mere history of dysentery is worth little.

tubercle of the lungs in Bengal. As the symptoms are often marked by the more noticeable bowel-complaint, and as the clinical symptoms of the lung disease are often not much in evidence, as the cough is frequently absent, and the fever looked upon as malarial or symptomatic, it is easy to understand how such is sometimes overlooked till routine or some accident leads to an examination of the chest. A case of this kind occurred last year in Bhagalpur Jail. The patient had been suffering from chronic dysentery, and it was only when I happened to examine the lungs that I found his true condition. This was shortly after confirmed on the *post-mortem* table when I found a cavity in one apex and the other lung studded with tubercles, the large intestine at the same time showing the well-known appearances of grey sloughing ulceration.

The cachectic condition which is being described may therefore be found in the subjects of malarial cachexia or of tuberculosis. There is still another disease which is intimately associated with the worst form of dysentery, that is scurvy. That a scorbutic taint is a strong predisponent of dysentery is certain, but I do not think that we see much of this in the jails of Bengal at least. I am not one of those who see scurvy in every case of blue-black swollen gums, which occur so frequently in September, October and November in unhealthy years. I hold strongly to the opinion that such cases are malarious rather than scorbutic (but that is another story).*

It is, however, very difficult to disentangle the causative relations of malaria and scurvy in these cases of "chronic dysentery." I am of opinion that a condition allied if not identical with scurvy can arise in a person who has suffered from repeated attacks of fever of an irregular type, due I presume to want of assimilation and the disordered state of the digestive apparatus produced by the repeated attacks of fever and food unsuited to the febrile condition. On questioning such patients it will usually be found that they have had frequent attacks of fever, and have suffered from previous attacks of dysentery and diarrhoea before their admission to jail.†

The condition then which we have endeavoured to describe, which is for want of a better name called "chronic dysentery," appears to be

* A remark of Dr. Bovill quoted in the S. C. Report for 1877 (India), p. 65, as follows: "Prisoners who get extra vegetables and lime juice still continue to suffer from a soft spongy condition of the gums with perhaps glazed and fissured tongues"—is as true to-day as it was twenty years ago.

† Last year the Editor of *B. M. J.*, in criticising my article on the nutritive value of Bengal Jail diets (*I. M. G.*, May 1896), in which I spoke of malaria as a potent factor in jail mortality argued that it, was our fault that there should be such malaria. He apparently considered that the malaria was produced inside the jail, ignorant of the fact that almost every prisoner in jail has suffered repeatedly from ague in his own home, and in such cases slight causes will light up an attack of malarial fever with as much certainty as a lighted match will explode a powder barrel.

identical with what Norman Chevers called *Morbus Bengalensis*, or *Diarrhoea hectica*. It appears to be the result of a gradual failure of digestion, assimilation, and nutrition due to either repeated attacks of malarial fever, tuberculosis, or scurvy, or two or more of these conditions combined. It is therefore not so much a disease *suu generis* as a diseased condition. The patient after a long or short illness (I have seen such a patient pinch, pine and die within three weeks in spite of care and treatment) gradually gets weaker. In some cases, especially in the cold weather, the patient is carried off by pneumonia or œdema of the lungs; in the latter case in a few hours.

There have now been described the three forms of disease to which the name of dysentery is commonly applied. We may now turn to the ætiology of these varieties, though we have already incidentally touched upon this point in endeavouring to differentiate them.

With regard to the "mild" form we have already indicated some of its predisposing and exciting causes, *viz.*, chills due to variations of temperature, unsuitable or badly cooked food. That it has a definite connection with malaria is shown by its prevalence in malarial years and *per contra* by its comparative absence in these jails where the prophylactic issue of cinchona and its alkaloids is thoroughly carried out. The remarkable decrease in the amount of bowel-complaints in some Bengal Jail in 1895-6 is, in my opinion, in great part due to the use of quinine as a prophylactic. Not only has fever lessened, but in some jails bowel-complaints have been conspicuous by their rarity. In the Central Jail at Bhagalpur (average daily strength 1,200) one case of diarrhoea a week, and a case of dysentery every ten days, has been the history of the past year. In 1895 bowel-complaints were also conspicuously absent from the large infirmary jail at Hazaribagh.

Among the measures which I consider of greatest importance in getting rid of these complaints are (1) early recognition of bowel-complaints and their suitable treatment in hospital. I far prefer to duly admit to hospital men complaining of diarrhoea and dysentery, and keep them there till cured. If they are merely relegated to the convalescent gang after a day's observation in hospital, the disease is sure to recur, and the medical officer finds in a week or two that the patient has very much run down in strength and lost weight considerably. To keep such a case a week or so in hospital and send him back to work cured will pay best in the end: (2) the second great means of prevention is attention to cooking and preparation of food. I believe the increasing attention given to cooking of jail food is bearing good fruit.

As regards the second form or acute dysentery, as this is considered a specific disease, our means of prevention must be disinfection and burning

of the stools, isolation of the patients from the ordinary sick, purification of drinking water and general measures of sanitation. This is the form of dysentery which I conceive played havoc with our armies, ships and prisons in pre-sanitary days. That it can be caused by excremental pollution of the soil due to faulty methods of sewage disposal is clear from the history of the outbreaks at Cumberland Asylum, Millbank Prison, and more recently at the Richmond Asylum, Dublin (which by-the-by, has also recently suffered from another tropical disease, the mysterious beri-beri). That acute dysentery can be caused by impure drinking water is one of the truisms of sanitary science, i.e., water polluted, we presume, by the specific organism of the disease, and there are several historic examples pointing to the use of water polluted by faecal matter as causing outbreaks which ceased as soon as the water-supply was changed. It cannot, however, be shown that the prevalence of dysentery in jails depends directly upon this cause, or that the very great improvement in the water-supply of jails has been followed by a *pari passu* lessening in the amount of dysentery. As an instance the case of Bhagalpur jail may again be quoted. In 1893, 1895 and 1896, especially in the latter two years, there was a most marked falling off in the number of dysentery cases, but the year 1894 was the worst on record for this disease. This cannot, I think, be explained with reference to the water. I know well the excellent condition of the water in 1895, as, in that year and in 1896, I examined it bacteriologically every ten days, and it is remarkable that, while in the latter half of 1896 dysentery was as conspicuously absent as in the previous 18 months, yet owing to various causes, which cannot here be mentioned, from June to December 1896, the filtration was very imperfect in the Municipal water works, yet no increase in bowel-complaints took place. I confess myself at a loss to explain the abrupt rise in the number of dysentery cases in most jails in Bengal during the year 1894; there is one fact which, however, is certain that it was a notoriously unhealthy year all over India, for the outside as well as for the prison population, and I think it will be found that, on the whole, a bad year outside means a bad year inside jail. This is the fact, explain it how we can. Another point which inclines me to believe that there is something in the old idea of the "epidemic constitution" of a year is that in a bad year we find frequent complaints from medical officers of self induced disease among prisoners (in the hopes of getting special indulgences in the way of ease and food), but in a healthy year such complaints are seldom heard. It would seem to me that causes which in a healthy year do little harm (such as eating raw grain, &c.), will, in an unhealthy year, give rise to serious forms of dysentery and diarrhoea.

We now come to a consideration of the causes, and prevention of the form of disease above described as chronic dysentery. We have already indicated the relationship of this condition to malaria, tuberculosis and scurvy. In such persons repeated attacks of dysentery even of the above-described "mild" form tend to produce this condition, as also loss of blood from piles, anchylostomiasis, &c.*

We cannot expect to get rid of such conditions by sanitation however perfect. No amount of sanitation practicable outside of Sir B. W. Richardson's Hygeia will prevent some patients from drifting into the state of malnutrition which I conceive to be the essential feature of so-called "chronic dysentery." We can do something against malaria by the issue of quinine, we can exclude scurvy, and we have some control over tuberculosis. It is this condition of malnutrition which I would repeat is the main thing we have to overcome in treating such cases. In fact if we may attempt a definition of the condition here described by its common name "chronic dysentery," it would run somewhat as follows—*a cachectic condition characterised by increasing debility, alternate diarrhoea or dysentery or it may be constipation, with more or less anæmia, œdema or dropsy occurring in patients who have been subject to repeated attacks of malarial fever, or are the subjects of tuberculosis or scurvy, or have suffered from a chronic insufficiency or unsuitability of food or from actual famine.*

It is upon this view of the cachexia that I lay such stress upon the necessity for and value of good cooking and attention to variety in diet. Some years ago I ventured the opinion that the "unaccustomed plenty of good food given in jails" was to be considered among the exciting causes of bowel-complaints among one class of prisoners in our jails, viz., aborigines, such as Southalis, Kole, &c. All will admit that these people are usually admitted to jail in bad or indifferent health, and that they are prone to dysentery of an intractable type. The reason I imagine to be as follows: Owing to repeated attacks of fever and other diseases the digestive apparatus has become more or less incapable of digesting proper quantities of food. The epithelial and glandular structures of the mucous membrane of the digestive tract are more or less destroyed, they may be able to dispose of the small quantities of food offered in free life, but when such a patient comes within reach of the abundance of jail food, much of the food not being assimilated, becomes little better than a foreign body, and an intestinal irritant and consequently a state of chronic dysentery is soon set up. The result is therefore *a state of physiological starvation* in the midst of

* There is a form of diarrhoea in persons subject to piles (as so many natives are) which is often confused with dysentery by medical subordinates. It need, however, only be pointed out to avoid such a mistake.

plenty, and the prostration and debility rapidly increase.* I am inclined to think that it would be found useful to give prisoners of this class less rice and *dal* for a few weeks after admission to jail till their digestive system became accustomed to the more liberal jail diet. I have heard that this plan has been tried with success in some jails receiving many prisoners from aboriginal tribes. It is possible that a similar plan might be useful in jails in some of the famine districts this year.†

We have now at considerable length discussed the three diseases usually called "dysentery." The mild form I look upon as non-specific, the acute form as a specific microbial disease, and the third not as a disease *sui generis* but a dyscrasic condition. We may now briefly turn to the question of the mortality of the disease. As in the published returns both dysentery and diarrhoea are given together I asked the medical officers of several jails in Bengal to send me the figures (and to them my thanks are due) in this way I have collected 6,136 cases of dysentery with 369 deaths or 6 per cent., some jails are above this rate, and some, *e.g.*, Hooghly, Ranehi, Chittagong, Cuttaek, Arrah, Patna, Motihari and Bhagulpur are below it. It is not a high death-rate compared with other recorded statistics. The death-rate for dysentery in 1894 in these jails was 9 per cent., of course this percentage includes all form of dysentery admitted to hospital.

I have no space left to say anything of treatment nor I have any specific to offer. In a few cases of bad dysentery I have had good effect from extract of *kurchi* (*Holarrhena antidysenterica*). Recently a writer in the *Lancet*, Dr. Maberly (*Lancet*, February 1897) attributed very good results in chronic dysentery to an infusion of *monsonia*, a plant common in South Africa. I am informed by Dr. G. King that this plant is not found in India, but a closely allied species. *M. Senegalensis* is found in India, from Senegal to the Deccan. Some one fond of indigenous drugs might try this species. In acute cases I still rely upon the time honoured Speecuanhia, after Seot-Docker's method.

The above paper has been written in the hope of being useful in clearing up our ideas on the subject of dysentery. It represents my present views on a subject I have paid much attention to for several years.

* That there is foundation for this view is shown by an analogous case in famine times. It is notorious that many famine people appear to get rapidly worse as soon as they are admitted to the Relief Camps, owing as Dr. D. D. Cunningham pointed out to the abundance of good food, too good for their degenerated digestive glands. *Vide* S. C. (India) Report for 1877, Appendix A, a paper of Dr. Cunningham which should be read by every medical officer during the present season.

† A planting correspondent of the *Englishman* has recently pointed out that a similar form of bowel-complaint occurs in tea-garden labourers *en route* to Assam, when they first come to receive their liberal rations on boardship.

THE SO-CALLED KALA-AZAR OF ASSAM.

BY SURGEON-MAJOR G. H. FINK, I.M.S.,
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THE disease called "Kala-Azar" appears to be enshrouded in as great a mystery in India at the present time as any other complaint.

Scientific investigators have revealed to us many signs and symptoms in this disease which we are all familiar with, and which on careful examination are found to be common to other diseases also; whilst others have brought before our minds' eye various other diseases with characteristic symptoms, some of which bear a very close resemblance to kala-azar.

The terms beri-beri, anchylostomiasis, pernicious anæmia and malarial cachexia are names we frequently see in connection with descriptions of the so-called kala-azar, thus showing that a differential diagnosis of these diseases is very necessary in order that we might arrive at some settled opinion as to what kala-azar is. Perhaps it is as important to become acquainted with what it is not before we can arrive at a correct diagnosis by exclusion as to what it is.

The physician in India often finds it very difficult to arrive at an early and sound diagnosis of a disease because of deviations in their character in this country, which destroy their usual physiognomical type, and rob them of their typical features which we are accustomed to see in descriptions by European authors whose experience is confined to the climate of Europe.

When we come to analyse the cause of this, we find that malaria plays a very great part in many complaints, if not in all of them, and a doubtful diagnosis therefore is not to be wondered at, especially in the advanced stages of many diseases, particularly in the so-called kala-azar which, in many of its clinical and pathological appearances, bears a very near resemblance to the diseases abovementioned, and has therefore given us a very hard nut to crack.

With regard to our native patients in India we find it sometimes exceedingly difficult to arrive at a correct diagnosis, because they come to seek European medical aid when the fever has become obstinate, and will not be subdued by the various Indian drugs in common use. Often, as the last flicker of life is passing away, the friends will bring the dying patient to the dispensary for medical aid. Those of us who have joined our experience of disease whether by study at the bedside of a European or a Native hospital, know how important it is to have the medical history of a case before us, which is often a clue to an early and correct diagnosis; but when the medical history is a blank, and friends are either reticent or unable to give us the information sought for, the task is doubt,

ed, for by mere intuition, the problem the physician has to face by the bedside of a dying man is the most trying and difficult to even the highly gifted. He then has to depend on the clinical signs and symptoms before him, and very often the missing link in the complicated chain causes an error of diagnosis. There are therefore insuperable difficulties and obstacles to climb before a really definite and correct diagnosis is arrived at in many a case of sickness in this country. The difficulty with reference to such a disease known as kala-azar is immensely great, inasmuch as the experience of various medical men who know, or think they know, all about the nature of the complaint from either hearsay or personal knowledge and experience is found to vary. We hear of one medical man with a wide experience of the disease recognizing it as such from the physiognomical symptoms; but on the crucial test being applied in his presence as suggested by him, by a second medical man, the results of their conjoint investigation into the nature of the disease are negatived. The disease then is called by some other name, and is not the so well-known and so easily recognised "kala-azar." Is there such a disease then as kala-azar? There is a disease no doubt which has created a high rate of mortality in Assam, and which, from all accounts, appears to be spreading slowly but stealthily into the homes of its inhabitants from one district to another, and which for a name, seems at present to lie between the devil and the deep sea.

But has not the disease known as malarial fever and cachexia been known to have played a great part also in creating a high mortality in India for many many generations? Has this disease not forsaken some of its old haunts and appeared with redoubled force in neighbouring places?

Is not the fact, which was pointed out some three years or more ago, not by a member of our noble profession of medicine, but of the Covenanted Civil Service of India, I believe—namely, the altered course of our Indian rivers which exposed dry beds of malarially impregnated soil, sufficient cause for the terrible ravages of malaria? I maintain that it is the cause along the banks of the Brahmaputra. The shores of the Brahmaputra are daily washed by the waters which are disturbed by steamer traffic, and eaten away year by year. I believe that if the history of kala-azar be enquired into on such lines, it will be found that it is clearly traceable to the increased exposure of malarially impregnated soil. The direction of wind currents and the adjacence of a town, hamlet or village to the exposed areas would cause an unusual number of cases, which might almost assume an epidemic form. The presence of malaria in India for so many generations is true; but the exposure of malarially impregnated soil in fresh additions to the already malarious tract ex-

posed is sufficient to account for the disease breaking out in so violent a form as to create a panic, for when it does appear, it is with redoubled force.

Surgeon-Major Giles, the author of the report on kala-azar and beri-beri, writes in his introductory remarks with regret as to the term beri-beri creeping in as firmly as it seems to have done in Assam,—a term, he says, which, though used by Europeans, is unknown to the other inhabitants.

Dr. John Grant Malcolmson made an attempt to trace the etymology of the term beri-beri to "bhay-ree," a Hindustani word meaning sheep; but where the connection lies is difficult to see.

The word beri-beri, I believe, is derived from bhari-beri: bhari-heavy; beri-fetters; "like a pair of heavy fetters," as the Hindustani might say, in describing the constriction or loss of sensation around the legs and ankles; and for reasons which I am about to adduce in support of this idea, it will be seen that there is something in it which might explain how the term has crept into use. I do not pretend to be a James Murray in tracing the etymology of words to their ultimate root; but it struck me that in the same manner as an English workman would describe the feeling of a tight cord or belt in certain nervous complaints, the Hindustani individual might liken his discomfort to a pair of heavy fetters, especially would it be the case in Hindustani emigrants who suffer from the disease known as beri-beri, as there are perhaps among their number some at least who know the feel of a pair of fetters. Giles informs us that beri-beri, the kakke of Japan and kala-azar are all likely the same disease. He also asserts that every case of kala-azar is not necessarily anchylostomiasis, and he objects to the misleading terms of kala-azar and beri-beri. Then after all that we have heard as to what this mysterious disease is not and the likelihood of its being anchylostomiasis, what conclusions have we arrived at as to what it really is?

Some say it is anchylostomiasis, pure and simple; others, that it is anchylostomiasis plus something, or something plus anchylostomiasis. Then what is this mysterious and unexplained something? It is a curious and significant fact that most observers lean towards the malarial origin of the disease, whilst Giles and a few others cling tenaciously to the anchylostoma view, or, at all events, explain the high rate of mortality as due to the parasite.

There is one class of observers who deny any relation between kala-azar and anchylostoma. Those who take the "malarial origin plus something" view of it take perhaps a very safe view; but yet that does not help to unravel the present mystery which overhangs the disease, nor does it in any way hasten a solution to the difficulty, for that something is what we are after. Giles informs us also that Dr. Kynsey in his

report on anæmia or beri-beri of Ceylon has established, without a doubt, that the disease known as beri-beri is anchylostomiasis. This then hints some connection with our kala-azar of Assam, whose strong characteristic is anæmia of an intense degree, which Giles, in his investigations, traced to anchylostoma as the cause.

(To be continued.)

A Miquoy of Hospital Practice.

A CASE OF PERITONITIS, CAUSED BY PERFORATION OF THE SMALL INTESTINE BY THE STALK OF AN EGG-PLANT FRUIT (SOLANUM MELONGENA) AND RESULTING IN DEATH.

BY SURGN.-CAPT. W. FREDMORE, I.M.S.,
2nd Burma Bn., Bhamo.

THIS case, which lately came under my observation is, I think, of interest for three reasons:—

1stly.—On account of the difficulty in diagnosis due to peculiarity of symptoms.

2ndly.—On account of the direct cause of the disease, viz., perforation of the intestine by the sharp point of a severed stalk of an egg-plant fruit.

3rdly.—It is instructive inasmuch as it teaches one not to wait too long before resorting to operative measures in obscure cases of intestinal obstruction or peritonitis which do not yield to non-operative treatment.



Bela Singh, aged 37, a sepoy, came under observation on 2nd December 1896. He complained of having had fever for two or three days, and of pain in the abdomen with occasional vomiting. Temperature was 101°. The bowels were constipated. The tongue was clean and moist. There were no other physical signs present to indicate any organic lesion.

The treatment adopted was phenacetin gr. x followed at suitable intervals by two-grain doses of sulphate of quinine administered hypodermically.

December 3rd and 4th.—Temperature rose on 3rd evening to 100°, and on the evening of the 4th to 101°. On each morning of the above days it fell to normal. The bowels were still constipated. Four grains of calomel were given, but as this had no effect, a soap and water enema

was administered with, the hospital assistant affirmed, a satisfactory result.

December 5th.—Temperature rose in the evening to 101°. There was slight pain in abdomen and occasional vomiting.

December 6th.—Hiccups came on during the early morning, and the occasional vomiting continued. Temperature was normal. Tongue clean and moist.

December 7th and 8th.—Temperatures remained normal. The hiccups became at times very distressing. Vomiting occurred at intervals. Pain and tenderness in the umbilical region were complained of, but, with the exception of hiccups, the symptoms were not urgent. The bowels had remained constipated since the enema. Milk formed the patient's diet from the beginning. The following modes of treatment were tried in town, but with little effect;—blisters over both vagi in the neck, counter-irritation by means of heat, and mustard over the stomach, chloroform inhalations, morphia hypodermically with small pieces of ice kept in the mouth, and sedatives and antispasmodics internally. The chloroform inhalations controlled the hiccups, but on cessation of the remedy, the symptoms in a short time returned.

December 9th and 10th.—The temperature rose on the evening of the 9th to 100°. After this date there was never any elevation of temperature. On the 10th an oblong prominence resonant on percussion was noticed in the umbilical region. At the autopsy this prominence was found to be caused by the mass of intestines matted together and floated up by the fluid in the peritoneal cavity. Both flanks were dull on percussion. There was no shifting dulness. Spells of freedom from hiccups.

December 11th, 12th and 13th.—Hiccups at intervals. The swelling in abdomen was more prominent and very tender. Vomiting now occurred whenever nourishment was taken.

December 14th.—The patient was much weaker. It was now evident that some form of intestinal obstruction was causing the symptoms. The bowels remained constipated, and a repetition of the enema on the 13th had no effect. As no food was retained in the stomach, rectal feeding was resorted to, and it was decided that an operation was the only rational treatment. On the morning of the 15th the patient became collapsed, and died somewhat suddenly before any operation could be accomplished.

At the autopsy, general purulent peritonitis was found. The intestines were matted together and fixed with lymph which, with the intestinal coils, had formed several loculi containing purulent fluid. Lymph was deposited abundantly on the visceral and parietal peritoneum throughout the abdominal cavity which contained about seven pints of greenish purulent fluid.

About six feet below the duodenum a sharp pointed piece of wood was found perforating the



Foreign body removed from intestine.

intestinal wall as represented. The foreign body was a portion of the stalk of an egg-plant fruit.

The soft parts had been dissolved leaving a sharp pointed woody fragment as shewn in the illustration below. The wall of the intestine in the neighbourhood of the perforation was much thickened, and its lumen contracted.

The sharp-pointed portion of the foreign body was sticking through the perforation into the peritoneal cavity, while the expanded portion was in the lumen of the intestine, and prevented the withdrawal of the fragment at the post-mortem examination.

December Dates of Observation	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th
Days of Observation-	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Temperature Fahrenheit.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.
108°	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.
102°
101°
100°
99°
98°
97°
96°

A SUCCESSFUL CASE OF OVARIOTOMY.

By SURGN.-CAPT. W. VOST, M.B., C.M.

Civil Surgeon, Gonda.

(Reported by ASST.-SURGN. H. D. PANT.)

MUSSUMMAT CHAURASI, Hindu female, *æt.* 40' mother of one child aged 9, was admitted into the Gonda Female Hospital on 2nd March 1897, for a painless freely moving abdominal tumour. It commenced in the left side, and the patient noticed it for the first time about nine months ago.

Its free movability obscured the diagnosis, and it was after repeated examinations that its nature as an ovarian tumour was decided upon. The patient, strong and well built, was in fairly good health.

After the usual preliminary preparation she was put under chloroform on 10th March 1897, and a three-inch incision was made in the middle line. On introducing the trocar a little thick colloid matter came out with great difficulty. As it was not possible to thus reduce the size of the tumour, the alternative of extending the incision upwards and downwards was resorted to, and the tumour

which was quite free from adhesions, was then extracted. The long pedicle was transfixed and tied with silkworm gut and dropped into the abdomen. The tumour proved to be a colloid cancer and was mostly solid. In closing the wound several stitches were, by error, passed through the omentum, but the mistake was at once noticed and rectified. A drainage tube was introduced at the lower end. Some blood-stained serum was removed by a syringe from the glass tube 24 and also 48 hours after the operation, and it was then that the drainage tube was removed; but the dressings except over the tube were not disturbed. The after-course was quite uneventful; no fever, and no other trouble worth noting. Alternate stitches were removed on the eighth, and the remaining on the thirteenth, day after the operation.

A small circumscribed abscess near the umbilicus at the site of one of the stitches, and slight dysentery brought on by carelessness of the patient herself, were the only complications during her stay in hospital.

The diet consisted of pancreatized milk for the first two days, pure milk for six days, milk and

rice for seven days, after which the ordinary diet was allowed.

The patient was discharged cured on the 12th April 1897.

CASES OF UNDIAGNOSED LIVER ABSCESS.

BY SURGN.-CAPT. D. M. MOIR, M.A., M.B., C.M.,
Presidency General Hospital, Calcutta.

THIS paper is chiefly a record of blunders; but, as we usually learn more from our mistakes than from our successes, perhaps an account of the following cases may prove of more use than that of a series of successful cases that have been early diagnosed and easily treated. They illustrate what may be termed the *latent* type of hepatic abscess, and show the fallacy of setting aside the possibility of liver abscess in consequence of the absence of pyrexia, of pain, or of the other ordinary symptoms which are too well-known to require mention.

CASE I shows that a liver abscess may contain seventy ounces of pus, while the patient's temperature ranges from subnormal to 99°F.

During the absence of one of the hospital staff, I was asked by the medical subordinate in charge of his wards to open what he called a "cold" abscess in a woman's side. This I proceeded to do on the 9th December 1894.

I found the patient to be a puny, emaciated, Native Christian woman, about 44 years of age. After asking a few questions, which she was either too stupid or too frightened to answer satisfactorily, I examined her temperature chart. I found her temperature normal for that day and the three preceding days, and that it had only once reached 99.4°F. during the week she had been in hospital, although the temperature had been taken at intervals of 4, 6, or 8 hours every day since admission.

Relying on the absence of pyrexia I rashly concluded that I had to deal with a simple abscess in the subcutaneous tissue of a patient poor in physique, who was probably suffering from the combined effects of poverty, neglect, and malarial cachexia. Without making any further physical examination, I incised the small swelling, which was situated over the 9th intercostal space in the right infra-axillary region. To my surprise some pus escaped, which was suspiciously like that from a liver abscess. The skin wound was quickly covered up, chloroform was administered, and then the wound was enlarged and explored. It was found to lead into a huge liver abscess, from which three and a half pints of pus were evacuated. A long drainage tube $\frac{1}{2}$ inch diameter was inserted, and a dry dressing applied.

Probably resection of a portion of the 10th rib and the use of a wider drainage tube would

have hastened recovery, and might have saved some pain and discomfort in the after-treatment; but any prolongation of the operation was contra-indicated owing to the patient's weak condition.

She made slow but steady progress to recovery; the tube was finally removed on the 85th day after operation (3rd March 1895), and she was discharged looking quite plump and cheerful on the 11th March, i.e., on the 92nd day after operation, or 100th day after admission. At the time of her discharge the scar was firm and depressed, and the total hepatic dulness measured 3 inches in the mammary and 4 inches in the mid-axillary lines. She was last seen in January 1897, when she appeared in excellent health. During the first fortnight after the operation (9th to 22nd December 1894) her temperature remained normal. On the 15th, 16th and 18th days there were afternoon rises to 100°F., which were caused by the pressure of the drainage tube. The only other pyrexial attack occurred between the 1st and 5th January 1895, i.e., from the 24th to the 28th day, during which time the temperature ranged between 100° and 103.8°F.

This fever was of malarial origin, and yielded to the action of quinine. During the remainder of her stay in hospital her temperature remained normal or subnormal.

Careful inquiry from the patient's husband subsequent to operation elicited a history of dysentery for a fortnight eight months prior to admission, and that some time afterwards she had suffered from fever.

(To be continued.)

PAPER ON STABS OF THE ABDOMEN.

BY SURGN.-CAPT. C. DUER, I.M.S., *Rangoon.*

A GOOD many cases of stab of the abdomen are brought to this hospital. The all-important point in these cases is to determine whether the weapon has penetrated the abdominal cavity; and having penetrated it whether any of its contents have been wounded. I consider that an attempt should always be made to settle this point by a digital, in some cases aided by a visual examination. No treatment in the absence of an accurate diagnosis can be expected to be efficient, and the above I believe to be the only way of arriving at an accurate diagnosis. Should the stomach, liver, spleen, kidneys or urinary bladder be wounded then there may be very definite symptoms such as vomiting, hæmatemesis, signs of free fluid in the abdominal cavity, dysuria, hæmaturia and the like. But wounds of these organs are far less common than those of the intestine, and when the intestine is wounded symptoms are generally absent. Even the marked shock, resulting from injury to important organs, of which we read, is much more often absent than present.

Classification.—For the present purpose stabs of the abdomen may be conveniently divided into two classes:—

1. Those inflicted by large weapons, such as large knives or pointed bamboos.
2. Those inflicted by small weapons, such as penknives and clasp knives.

The former class will be treated of first.

The diagnosis of penetration is usually easy. If penetration has occurred, the finger will readily enter the abdomen. Should there be doubt owing to obliquity of the track through the abdominal wall the track must be slit up. In many cases of this class some of the viscera are found protruding through the wound. The protruding viscera should be cleansed and examined, and wounds of them must be dealt with. Before reduction can be effected the wound in the abdominal wall will generally require enlargement. Now arises the important point—Is any other viscus within the abdomen injured? Another important question is—When does this prolapse or hernia occur? Does it occur immediately on receipt of the stab or later? To answer the second question first I think it occurs immediately on withdrawal of the knife. On receipt of a sudden stab the recipient would draw a deep breath with fixed abdominal muscles, continuing an appreciable time, after withdrawal of the knife, and the consequent increase of abdominal pressure would cause the prolapse. Evidence on this point would be valuable.

With regard to the first question, if the hernia occurs immediately on withdrawal of the knife, then the portions of movable viscera occupying that particular part at that moment will be forced out. These will be the most likely to be injured. If uninjured, then probably no other portions will have been injured unless the weapon penetrated to a very considerable depth.

Bearing the above in mind, to continue the treatment. The abdominal wound having been enlarged in a convenient direction, the protruding viscera should be drawn carefully on one side and protected, and a digital examination should be made of the neighbouring parts of the abdominal cavity. Visual examination can also be employed to a limited extent. Extravasated blood must be sponged out. If little in amount, and if the results of digital and visual examination are satisfactory, the protruded viscera are to be reduced and the wound closed. If there be much blood search for its source must be made, the wound being enlarged still more if necessary. In such cases a counter opening above the pubes, irrigation and drainage may be required.

We now pass on to the consideration of the second class of cases—those inflicted by small weapons. Here the skin wound is too small to admit the finger, the only probe which is of any service, and which we have a right to employ. The skin wound must therefore be

enlarged sufficiently to admit the finger which is then passed along the track of the wound separating the muscular fibres if necessary. Should the peritoneum be perforated, the finger will readily detect its sharp and resistant edge and pass into the abdomen. Though the original wound in the skin will not admit the finger, I have found that of the peritoneum to do so readily without enlargement.

Having thus arrived at a diagnosis of penetrating wound, the wound should be enlarged at once so as to admit about three fingers. Digital examination without enlargement may be first made, but whether this yields positive signs such as feculent matter, intestinal contents, bile-stained fluid or a fecal odour on the finger, or negative signs, the treatment is one and the same—enlargement. Having enlarged the wound, the neighbouring coils of intestine should be drawn carefully into view and examined, each small portion being pushed onwards after examination. Collapsed intestine would naturally suggest a very careful search, and also the escape of bile-stained fluid from the abdominal wound during the manipulations. If after careful search there is thought to be no injury of viscera, then the abdomen is closed in the usual manner. I shall now give extracts from a few cases illustrating the above points.

Case 1.—Lutchmi, a fat healthy-looking Hindoo female, *æt.* 20, was brought at 4 A.M., on 19th November 1896, said to have been stabbed at 11 P.M. Between the left anterior superior iliac spine and the umbilicus and 2 inches internal to the former was a punctured wound through which a congested knuckle of small intestine was protruding. On this intestine was a small wound (non-penetrating) from which a good deal of venous blood was escaping. There were also three serious incised wounds on the body. The surface was very cold, and the pulse could not be counted. A ligature was applied to the bleeding point on the intestine, the abdominal wound was enlarged, and the prolapse having been reduced was closed as quickly as possible. She died about 3 hours after. At the *post-mortem* examination the small intestine was found to have been transfixed at one place, and two round worms and a little blood but no intestinal contents were found in the abdominal cavity. In this case the patient's general condition precluded the adoption of the treatment detailed above.

Case 2.—Nga Kyi, a male Burman, was brought at 10.30. A.M., on 5th October 1896, said to have been stabbed at 6 P.M., on the 4th. He was much collapsed. Portions of the stomach, transverse colon and great omentum were protruding from a wound in the upper part of the belly, a little to the right of the middle line. The prolapsed viscera were not collapsed. They were very dirty. A wound of the prolapsed portion of stomach $\frac{3}{4}$ inch long, which only appeared to divide the serous and muscular coats was

covered and sewn up. The prolapsed viscera having been very carefully cleaned, the opening in the belly wall was enlarged down to the umbilicus, and the viscera were returned. Much blood and clots were removed from the pelvis and loins by sponges on holders, and the abdomen was then closed. He died about 6 hours later. The stomach was found watertight. On opening it, however, the m.m. was seen to have been divided about $\frac{1}{4}$ inch. There was no peritonitis, and only a little blood in the pelvis. It was a great pity this man could not have been brought to the hospital sooner.

Case 3.—Nga Kyaw Wai, a fairly nourished Burman, *æt.* 26, was admitted at 9-15 A.M. on 16th March 1897, said to have been stabbed at 5-30 P.M. on 15th March 1897. He had a wound on the left side of the abdomen in the mid-axillary line midway between the last rib and the crest of the ilium, from which some congested omentum was protruding. The pulse was 72, and very good in quality. The omental hernia was ligatured and removed, and a digital examination not revealing any visceral injury the wound was closed. Towards evening he became restless and complained of abdominal pain and tenderness, and the respirations were very frequent. At 9-30 P.M., a median incision was made below the umbilicus, and the whole of the small intestine and the sigmoid flexure of the colon were examined and found uninjured. There was no lymph on the intestines. The abdomen was washed out with a large quantity of hot boracic lotion and closed. He died at 3 A.M. on 18th March 1897. There was general peritonitis, and a small puncture was found in the colon at the splenic flexure. At the end of the notes on this case I find the following:—*N.B.*—The original wound should have been enlarged at the first, and the intestines in its neighbourhood examined. A counter opening for washing purposes might then have been made above the pubes."

Case 4.—Is that of a Burman cooly, *æt.* 22, was admitted at 3-30 A.M. on 2nd February for a wound on the left side of the abdomen $\frac{1}{2}$ inch long on a level with the umbilicus and a little internal to the anterior superior iliac spine. He was very restless and complained of much pain. On receiving information at 7-20 A.M. I had him chloroformed. The skin wound not being sufficient to admit the finger it was enlarged. The finger then passed immediately into the abdomen. It detected nothing, but on withdrawing it a little greenish bile-stained fluid escaped.

The wound was enlarged, and after some search a wound of the small intestine was found. There was some recent lymph on this portion. This wound was closed. Next the abdomen was opened above the pubes, irrigated, and a glass drainage tube was here introduced. He died about 70 hours after.

At the *post-mortem* general peritonitis was found. The sutured wound in the small intestine was found to be about 3 feet from the stomach and was watertight. A second perforation was found in the small intestine—1 foot from the stomach. There were no other perforations or wounds of viscera, and in neither case was the gut transfixed.

Case 5.—Is an extremely interesting one. A well-nourished native of Burma was admitted at 8-30 A.M. on 1st March 1897, and died at 9-15 P.M. on the same day. I saw him on admittance and did not consider his wound serious, or that it could possibly have penetrated his abdomen. At 7-30 P.M. I was called to see him and found him almost pulseless with distended abdomen and signs of much fluid in the abdomen.

He had a transverse wound $1\frac{1}{2}$ inches long at the level of the lower end of the sacrum and just to the right of the middle line. At the *post-mortem* examination it was found that the knife had passed between the sacrum and coccyx, had then perforated the floor of the pelvis, and had penetrated a coil of small intestine about midway between the stomach and great intestine. The abdomen contained a great quantity of blood. The source of this was not demonstrated, but it must have been the internal iliac vein or one of its large tributaries. All other organs were healthy and uninjured.

After the above list of casualties I shall mention briefly two cases in which the result was satisfactory, and you will observe there was every reason why it should have been so.

Case 6.—A Chinese tailor, *æt.* 40, was admitted for an oblique stab $\frac{3}{4}$ inch long parallel to the costal margin just to the right of the middle line, and about midway between the xiphisternum and the umbilicus. The skin wound having been enlarged, the finger passed directly into the abdominal cavity. Nothing abnormal was detected by it, and an incision $2\frac{1}{2}$ inches long in the linea alba terminating below at the umbilicus was made, and the abdomen was opened. Still no injury to any viscera could be detected. The wounds were closed, and the man made a good recovery.

Case 7.—Ko Oung Gah, *æt.* 56, was admitted with a small wound above the middle of the right iliac crest which might have been inflicted by a penknife. Under chloroform the track was slit up and found to end in the muscles. It was closed with sutures. For a day or so after he was unable to pass urine and complained of abdominal pain. By reason of an accurate diagnosis these symptoms were regarded with equanimity. The wound healed by first intention, and he was discharged on the eighth day.

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DOUGLAS STEWART,

Secretary,

Standard Buildings, Dalhousie Square,

CALCUTTA.

Indian Medical Gazette.

JUNE, 1897.

PLAGUE IN INDIA.

It is very satisfactory to observe the gradual and steady decline in the prevalence of plague in Western India. Plague has happily almost disappeared from Bombay, Karachi, Poona, and Sukkur, while the only places at which it is still epidemic are Cutch-Mandvie and Damaun, which have suffered and are still suffering severely. The continued prevalence in these two places contrasts with the general and simultaneous subsidence of the disease in other affected areas. It would be interesting to note how far climatic or other conditions may explain this difference. It is a well-known fact that high temperature, especially when dry, is inimical to the spread of the disease, and its marked decrease in the Bombay Presidency in the months of May and June is only what was anticipated. Damaun and Cutch-Mandvie, therefore, are of special interest, and we trust that the conditions which favour the prevalence of the epidemic there may be thoroughly investigated. At the same time, while pointing out that the high temperature has probably been a factor, in controlling the epidemic, the labours of the Plague Committee and the medical officers working with them in Western India have undoubtedly played a very important part in the suppression of the plague. No efforts have been spared on their part to eradicate the disease, and it is a matter of regret that the gravity of the situation was not recognised earlier, and that the disease should have been allowed to have gained headway before their services were entertained. If the same energetic policy had been adopted in the earlier stages there can be little doubt

that the disease would not have gained the hold it did on this country, and the restrictive measures which are now imposed on trade and traffic would not have been found necessary.

It is needless, however, to dwell upon the past, except so far as it may furnish a guide for the future. One of the lessons taught by the late epidemic is the recognition of the insidious nature of the disease which, when introduced into a community, may smoulder unregarded until conditions are favourable for an outburst. It follows that a careful watch is required to be kept over all those localities into which plague has been imported, and that the first signs of recurrence should be energetically dealt with, nor should there be any relaxation in the measures adopted for the prevention of the spread of the disease from infected localities. We note with pleasure that the precautionary measures on the railways are not being relaxed, and as long as there are any cases in India it would be inadvisable in the interests of the unaffected areas to slacken them. In connection with the spread of the disease, we would draw attention to a valuable paper by Surgeon-Captain Grayfoot published in our last issue. It is entitled "The Human Factor in the Spread of Plague and the Lesson it teaches."

He clearly shows that the localities attacked in the Bombay Presidency were not affected until after cases of plague had been imported into them, and that the interval of time between the commencement of imported and local cases varied considerably. A map of the Bombay Presidency, which he gives showing the localities into which the plague was imported, and in which afterwards the local residents were attacked, is remarkable as a pictorial representation of the hold which the plague acquired in the Bombay Presidency. Attention has naturally been chiefly directed to the incidence of the disease on large towns, but this map brings out into uncomfortable prominence the fact that throughout the Bombay Presidency the plague has spread in nearly every direction, and that it is not the towns of Bombay, Poona and Karachi which have to be only watched for a recrudescence of the disease, but also those villages and townlets which are of small importance under ordinary circumstances, but which, on account of their potentialities in regard to plague, must be a source of anxiety and danger.

THE BUILDING COMMISSION FOR CALCUTTA.

THE appointment of a building Commission is altogether a new departure in the cause of sanitation in India, and one which will commend itself to those interested in the public health of our Indian towns. For though the Building Commission is for Calcutta only, yet there can be little doubt that its deliberations and conclusions will form the basis for consideration and guidance to all municipal authorities in India. The result cannot fail to be far-reaching, and in this respect the benefits to be secured from Sir Alexander Mackenzie's wise action possess more than a local interest.

The Resolution of the Bengal Commission appointing the Commission is as follows:—

"For some years past the Health Officer has pressed upon the Corporation of Calcutta the necessity of amending the Building Regulations in force in the Municipality, in order to make suitable provision for *inter alia*) fixing the minimum width of public streets, limiting the height of houses in relation to the width of the streets on which they stand, controlling the construction of brick buildings on *bustee* lands, and fixing the minimum size of courtyards within houses, as also the minimum space to be left between the backs of houses for the purpose of ventilation. The subject was discussed at length in the Annual Administration Reports of the Corporation, and the Government Resolutions thereon, cited in the preamble of this Resolution; and the Lieutenant-Governor expressed his views on it in paragraph 19 of the Resolution on the Report for the year 1895-96, to which were annexed extracts from Dr. James's report on the outbreak of plague in Hong-Kong in 1894, bringing out very clearly the intimate connection between defective dwelling-houses and spaces and epidemic disease. In that Resolution the Commissioners were informed that if, after considering the subject, they came to the conclusion that a special Building Act for Calcutta is called for in the interests of the health of the city, the Lieutenant-Governor would be prepared to appoint a representative commission to formulate the principles upon which such an Act should be based. Since then the spread of plague in Bombay, Poona, and Karachi has given prominence to this aspect of the question, and the report of the sanitary officers deputed by the

Medical Board to enquire into the condition of Calcutta, has shown to what an extent overcrowding prevails in Calcutta, and how the construction of buildings in the older part of the town impedes or renders impossible any effective conservancy. In the letter of the 28th December 1896, the Lieutenant-Governor pressed the Commissioners to come to an early decision on the question put to them in the Government Resolution referred to above, and in their reply they unanimously consented to the appointment of a commission on the understanding that they would make a thorough enquiry into the history and the operation of the existing law and bye-laws on the subject, and would ascertain in what respects these have proved defective, and whether a new Building Act is necessary, or whether the case can be met by amending the existing law. The Lieutenant-Governor generally accepts this view of the functions of the Commission. It has always been his intention that a thorough enquiry should be made into the history and operation of the existing law and bye-laws bearing on this subject, and such an enquiry must necessarily be undertaken before any scheme for fresh legislation can be drawn up.

"The task of the Commission will be intricate and difficult. They will have to deal with mixed questions of law, sanitation and engineering, and will further have to consider to what extent the principles recognized in European enactments relating to town buildings require to be modified with reference to the soil, climate and rainfall of Calcutta, the prevailing diseases, and the habits of all classes of the population. For these reasons, and as the proposal to amend the present law has given rise to some apprehensions among the leaders of Native society, the Lieutenant-Governor thinks it desirable that the Commission should be presided over by an officer of judicial experience. The Honourable Mr. Justice Trevelyan, who possesses great knowledge of Calcutta, and has had much experience of the working of the present law, has consented to fill the post of President. His appointment has been approved by the Government of India, and the Honourable the Chief Justice has rendered it possible for him to undertake the work by kindly consenting to relieve him of Court duties on the days when the Commission sits.

"The Lieutenant-Governor is accordingly pleased to appoint the following gentlemen to form the Commission:—

The Hon'ble Mr. Justice Trevelyan ...	<i>President.</i>
" " H. H. Risley, C.I.E. ...	} <i>Members.</i>
" " J. G. H. Glass, C.I.E. ...	
Mr. H. C. Williams ...	
" A. J. Hughes, C.I.E. ...	
Babu Kaly Nath Mitter ...	
" Nolin Behari Sircar ...	
Surgeon-Capt. H. J. Dyson ...	
Mr. W. Banks-Gwyther ...	} <i>Secretary.</i>
" F. G. Wigley ...	

The Commission will be requested to enter upon their labours at once and to report to Government the results of their deliberations within the next six months.

"As regards the direction, character and limits of their enquiries, the Lieutenant-Governor desires to give the Commission a perfectly free hand. It is, however, suggested that in addition to the specific points which have from time to time been touched upon in the Health Officer's reports, the Commission might usefully enquire into the desirability of opening out the congested tracts of Calcutta and the most feasible plan of effecting this. They need not, perhaps, unless they themselves find it desirable or necessary, go into the details of any particular scheme of street improvement, but they should examine the general principles on which such operations ought to be conducted in order to make them financially, as well as structurally, successful. It is very important to consider whether the special circumstances of Calcutta point to any amendment or modification of the ordinary Law of Land Acquisition. The issue which lies in fact at the root of the whole enquiry is, to what extent and in what directions private rights may equitably be made to give way to public needs. The Commission also will not fail to consider whether different sets of Building Regulations are not desirable for different quarters of the town, looking to the local circumstances of these areas."

The selection of the Honourable Mr. Justice Trevelyan as President is one which will meet with unqualified approval. He is an old resident of Calcutta and well acquainted with the habits and wants of the people, while his judicial experience renders him specially qualified to deal with conflicting interests and opinions.

The Commission, we think, is representative and is especially strong on the engineering side. This, with one exception, is as it should be, the exception being that the medical side of the

Commission is only represented by one member. Considering that the question dealt with is quite as important from a medical point of view as from the engineering, this omission appears to us to be a important defect which we hope there is yet time to rectify.

Medical News.

RETIREMENT OF MEDICAL OFFICERS.

SURGN.-LIEUT.-COLONEL STEPHENS has just been relieved of his duties at Purneah preparatory to retirement. He entered the service in March 1876, and, during his 21 years' service, has been mostly in Civil employ. He served through the Afghan and Hazara Campaigns, and received medals and clasps for these.

Brig-Surgn. Lieutenant-Colonel Meadows, Civil Surgeon of Cuttack, is about to retire. He also has been mainly employed in the Civil Branch. He served through the Lushai Campaign of 1872, was mentioned in despatches and obtained a medal and clasps.

LEAVE FOR MEDICAL OFFICERS.

THE present hot and exhausting weather that we are experiencing in the plains is causing medical officers to chafe at the abrogation of leave which has been enforced in consequence of the epidemic of plague. This stoppage of leave bears very hardly on many medical officers who have had no leave for many years past, and it is hardly in the best interest of the Government service to allow their officers to break down from long continued work in a tropical climate, when by timely leave such a result might be avoided.

There can hardly be the same strain on the department now that the epidemic of plague has subsided to such a great extent, and it follows that perhaps the Government might see their way to cancel their order on the subject.

TESTIMONIAL TO THE LATE DR. McCONNELL.

It will soon be a year since the lamented death of Surgeon-Lieutenant-Colonel McConnell, Professor of Materia Medica at the Medical College Hospital. Soon after his death there was a meeting of the Medical Profession in Calcutta to consider in what manner his memory should be perpetuated. Several resolutions were carried, and Committees were formed to carry out the objects in view. Up to the present we have heard nothing of what has been done. We hope that the matter will not be lost sight of, and that something will be done which will worthily

keep green the memory of a physician whose life and work were devoted to the interests of people of this city and to his duties connected with the Medical College Hospital.

DEPUTY SURGEON-GENERAL VANDYKE CARTER, I.M.S.

WITH the death of Henry Vandyke Carter, which occurred from phthisis on the 4th of May 1897, the Indian Medical Service has lost one of its brightest ornaments. Son of an artist he inherited the gift of drawing which he utilised to good purpose in the profession which he adopted. He illustrated Gray's anatomy and the various reports on leprosy, skin diseases, spirillum fever, which he made during his service in India. His scientific work was distinguished for its thoroughness and permanent value, and lay especially in the domain of tropical pathology. He will be best known for his researches on spirillum fever. His interest in scientific research took a very practical shape in the gift of Rs. 10,000 towards the establishment of a lectureship in Physiology in Bombay. The Honors which he received from the Indian Government did not correspond with the services rendered to this country. His career, however, will always serve as an example of what can be done for the advancement of science under the most trying climate and unpropitious circumstances.

THE VENICE CONVENTION. PLAGUE REGULATIONS FOR INDIA.

THE Government of India in the Home Department have issued a translation of the Convention framed at the Sanitary Conference recently held at Venice for the purpose of considering measures to prevent the spread of the plague, together with the following resolution:—

The regulations prescribed by the present Convention are based on the conclusions of the Sanitary Conferences of Venice, 1892, Dresden, 1893, and Paris, 1894. These conclusions have been modified to meet the special peculiarities of the plague, and in accordance with modern scientific views regarding sanitary precautions for the prevention of the spread of epidemic disease.

The following are the most important points in which the present Convention differs from the previous Conventions on which it is based:—

(i) The fact that the period of incubation in the case of plague may be considerably longer than in the case of cholera has led to several important modifications. By the Venice Conference of 1892, the period of incubation for cholera was fixed at five days. Proposals have been made to fix the period of incubation for plague as high as fifteen days, but the period which has been adopted by the Conference for

the purpose of the plague regulations is ten days.

(ii) The list of articles of commerce which may be considered "susceptible" has been considerably increased; but it has been left to the option of the Governments concerned to allow or prohibit the importation of the commodities on the "susceptible" list, no article being subjected to absolute prohibition.

(iii) It provides that the modern principles of disinfection should be substituted for the obsolete system of land quarantine, but, with a view to the protection of countries which may find it difficult to thus protect their borders, each of the Governments who are parties to the Convention is at liberty to close its frontiers to travellers and merchandise.

(iv) It embodies the provisions of the Paris Convention on the subject of the regulation of the pilgrim traffic, but in several respects those provisions have been altered in the directions for which the Government of India have contended. A separate communication will be sent on this subject.

The first chapter of the Convention deals with the measures for the prevention of plague which are to be adopted outside Europe. In the first place, it is laid down that the Governments which adhere to the Convention are to notify to other Governments the existence of plague within their several jurisdictions, and must communicate to them a statement of the measures of prevention that are being carried out to prevent its diffusion. This requirement as to notification is, however, subject to certain important conditions. Thus the area to be deemed infected is strictly limited to the actual district, town, village, etc., where the disease prevails; and no locality is to be deemed infected merely on account of the importation into it of a few cases of plague which have led to no diffusion of the malady.

The regulations next deal with the measures to be taken on the departure of vessels from infected ports. It is laid down that every person sailing on the vessel must be examined on shore immediately before embarkation by a medical officer appointed by the Government, and that the Consular authority interested in the ship may be present at the inspection. All infected and suspected articles must be subjected to careful disinfection on shore and in the presence of the Government medical officer in accordance with the rules for disinfection prescribed in Chapter III of the Annexure to the Convention, and no persons showing symptoms of plague may be permitted to embark.

Rules have been issued by the Governments of Bombay, Madras, and Bengal under the Epidemic Diseases Act, 1897, which have been in force for some time, prescribing precautions to be taken on the departure of vessels. The rules framed by the Government of Bombay, which are in force at the ports of Bombay and Karachi,

prescribe medical inspection and the removal from the vessel of any person suspected to be suffering from dangerous epidemic disease. The rules framed by the Government of Madras, which are in force at the principal ports of the Presidency, authorize the grant of a bill of health after medical inspection, the removal of any person suspected to be suffering from plague or not to be free from plague infection, and the disinfection of the infected portions of the ship. The rules framed by the Government of Bengal, which are in force at the port of Calcutta, prescribe medical inspection, the removal of persons suffering or suspected to be suffering from plague, and the detention of the vessel from which such persons have been removed for a period of seven days, after the lapse of which the vessel may proceed if no fresh case has occurred.

In order that the obligation imposed by the Convention may be fulfilled at an infected port, it is essential that the medical inspection and disinfection should be conducted exactly in the manner prescribed by the regulations and summarized above. The Government of India consider that it is also desirable that all non-professional attendants and relatives of any persons who, on examination, appear to be suffering from plague shall be prevented from embarking. If after the medical examination has been completed, and all the passengers and crew are on board a case of plague occurs, the patient and his non-professional attendants and relations must be landed and isolated on the first opportunity. The ship will then become an infected vessel within the definition given below in paragraph 7. Although the ports of Madras and Calcutta are not infected, the Local Governments have, with the approval of the Government of India, made the special rules for medical inspection referred to above, and in the opinion of the Governor-General in Council it is desirable that they should be assimilated, in the case of vessels sailing for ports out of India, as far as possible to those which will, under the terms of the Convention, have to be adopted at the infected ports of the Bombay Presidency.

I am to request that the rules issued by the Provincial Government may be altered in accordance with these instructions. The rules should be made applicable to all infected ports in the Bombay Presidency.

The rules regarding pilgrim-ships which form the next portion of the regulations will, as stated in paragraph 3 above, be dealt with in a separate communication. The regulations for the control of the general traffic in the Red Sea and the Suez Canal are based on the threefold classification of ships into healthy, suspected, and infected, adopted in the Venice Convention of 1892, with the modifications rendered necessary owing to the period of incubation in the case of plague having been fixed at ten days.

Healthy vessels are those which have left an infected port for ten days or more and have had no case of plague on board; suspected vessels are those on which, though cases of plague have occurred, no fresh case has occurred within twelve days; and infected vessels are those on which plague has been present within twelve days of arrival. The period of twelve days is arrived at, as in the case of the seven days' period in the Convention of 1892, by adding two days to the period of incubation.

A healthy vessel thus becomes entitled to free pratique at a port at which it arrives ten days or more after leaving an infected port, but the adoption of this period has the serious result that fast vessels sailing from Bombay will arrive at the Suez Canal before pratique can be granted. This difficulty has been satisfactorily overcome by permitting healthy vessels to pass through the Canal in quarantine, and to complete in the Mediterranean the ten days necessary to receiving free pratique at a port of arrival. Vessels passing through the Canal in quarantine may, subject to the use of electric light, coal in quarantine at Port Said by night as well as by day, and passengers may embark in quarantine at that port.

The rules for infected and suspected ships follow those of the Venice Convention of 1892. Vessels carrying a doctor and a disinfecting stove are allowed to pass through the Canal in quarantine after, in the case of infected vessels, landing those suffering from plague and persons who have been in actual contact with the sick or with infected articles, and after disinfection of the infected compartment of the vessel. Vessels without a doctor and disinfecting stoves are detained at Moses' Wells. Such vessels, if suspected, are detained for the period required for disinfection and for ascertaining the condition of the ship's health, while, if infected, the passengers are detained on shore under observation for a maximum period of ten days. The Medical and Sanitary staff at Moses' Wells is to be increased for the purpose of carrying out these regulations.

The last matter to notice in the chapter of the Regulation dealing with the measures to be adopted against the plague outside Europe is that of the measures to be taken in the Persian Gulf. The conclusions of the Conference on this question differ greatly from those embodied in the Paris Convention. Healthy vessels reaching Ormuz before the expiration of ten days since they last touched at a port infected with the plague must either complete that period at Ormuz or may, after medical inspection, continue their voyage up the Gulf or the Shatt-ul-Arab provided they do so in quarantine for such term as is required to complete the ten days. The same provision will apply to suspected vessels, that is vessels on which there

has been a case of plague, but no fresh case for twelve days, subject to submission to certain processes of disinfection, etc., at Ormuz; and infected vessels will, after landing their sick, together with those persons who have been in actual contact with them, and after disinfection of that part of the vessel deemed to be infected, likewise have permission to proceed on their voyage in quarantine. The final arrangements as to the sanitary station at Ormuz are to be a matter of agreement between the Turkish and Persian Governments, and until those arrangements are completed, a temporary sanitary station will be established on one of the islands in the Straits of Ormuz.

The second chapter of the Regulation deals with the measures to be adopted by the European Governments who have assented to the terms of the Convention. The provisions relating to notification have been mentioned in paragraph 4 above. Allusion has also been made in paragraph 3 to the regulations regarding the importation of merchandise.

This matter requires some further notice. The following are the commodities which are classed as susceptible, and the import of which may be prohibited—(1) Used body linen, clothes, bedding and other personal effects. (2) Rags, including rags compressed by hydraulic pressure and transported in bales as merchandise. (3) Used sackings, carpets, and old embroidery. (4) Green and untanned hides and skins. (5) Animal refuse (claws, hoofs, horse-hair, hair of animals generally, raw silk and wool. (6) Human hair. The prohibition of import is only to be enforced at the option of the Government concerned. The only articles which must of necessity be subjected on arrival to any precautionary measures, such as disinfection, are clothing, bedding, and similar articles which have been actually worn or used and which are carried as ordinary luggage, if they have been brought from an infected area and are considered by the local sanitary authority to be contaminated. The Government of India do not consider it necessary to add to the list of articles, the import of which by sea from infected ports into other ports in British India is prohibited in Home Department Notification No. 514, dated the 17th February 1897, and the bringing of which from the Bombay Presidency and Sind into other parts of British India is prohibited in Home Department Notification No. 1033, dated the 22nd March 1897. This remark applies only to the import of articles from the Bombay Presidency and Sind for use in other parts of India. In reciting the obligation imposed on the countries which are parties to the Convention to confine their precautionary measures to goods coming from the infected local area, it is stated in Chapter II, Section III, of the Regulations that this obligation only exists on the express under-

standing that the Government of the infected country takes the necessary measures to prevent the exportation of susceptible articles derived from the infected area. In other words, a Foreign Government would be at liberty to decline to receive articles classed as susceptible coming from a clean port, unless measures are taken in India to prevent the exportation from that port of susceptible articles coming from the infected area. The orders contained in the Home Department notifications of February and March last alluded to above, only partly fulfil this condition, since they only refer to used apparel and bedding, rags, waste paper, and used gunny-bags.

All Foreign Governments have not, however, availed themselves of the option of prohibiting the import of all the articles classed as susceptible even from Bombay itself, and the decree of the French Government of the 16th April 1897, which was published in the *Gazette of India* of the 22nd instant, under Home Department Notification No. 1545, dated the 21st instant, and is based on the Venice Convention of 1897, only prescribes prohibitory and precautionary measures against goods derived from the infected area. The decree only forbids the importation into France and Algeria of rags, animal refuse, claws and hoofs coming directly or indirectly from the infected local area. Raw and manufactured wool is admitted after disinfection, and this restriction is only imposed when the commodity comes directly from the infected area. Used and new linen, wearing apparel, personal effects and bedding and raw hides, coming directly or indirectly from the infected area are admitted after disinfection. The decree further provides that any vessel coming from an infected area, or having on board any of the articles coming within the description given above may only enter certain specified ports. In these circumstances, and in view of the optional nature of this part of the regulations, the Government of India do not propose at present to issue orders in addition to the orders of February and March last with the view of prohibiting the exportation from clean ports of articles included in the "susceptible" list and coming from the Bombay Presidency and Sind. But if the Governments of Madras, Bengal, and Burma, after consulting the mercantile community, consider that prohibitive orders should be issued with regard to all or any of the susceptible articles for the protection of clean ports, the Government of India will be prepared to consider proposals with this object. It is to be remarked that new gunny-bags are not in the list of articles classed as susceptible by the Conference.

The portion of Chapter II which relates to traffic by sea and the measures to be adopted at ports of arrival is of great interest, not only because of its direct bearing on the conditions of intercourse between India and Europe, but

also because it contains the conclusions of the Conference on the important subject of the quarantine of vessels.

The threefold division of vessels referred to above is maintained in this chapter. The regulations respecting infected vessels are that the sick are to be landed and isolated, and the remainder of those on board to be subjected at the discretion of the local authority, either to "observation" or to "surveillance" for a period which is not to exceed ten days from the occurrence of the last case of plague. The term "observation" means the detention under observation of the person either on board a ship or in a place of segregation on shore. Persons subjected to "surveillance" are not to be isolated, but are to be allowed to proceed at once to their destination where they are to remain under medical supervision. In the case of an infected ship the dirty linen and other effects of the passengers and crew which the local sanitary authorities may consider likely to be contaminated, must be disinfected. So also must the parts of the ship where the sick have resided, and the local authorities may require a more extensive disinfection to be carried out. Lastly, the bilge-water must be thrown out after disinfection and fresh drinking-water supplied.

In the case of suspected vessels, a medical inspection and the same process of disinfection, discharge of bilge-water and supply of fresh drinking water is prescribed. It is further recommended that the crew and passengers should be subjected to "surveillance" for a period of ten days from the date of arrival of the vessel. *Pratique* is to be given at once to healthy vessel, but it is also provided that, at the option of the local authority, the precautionary measures enforced in the case of suspected ships, except the disinfection of the vessel, may be required; and it is also recommended that the passengers and crew should be subject to "surveillance" for a period sufficient to complete a term of ten days from the date of departure of the vessel from the infected port.

The quarantine rules made by the Governments of Madras, Bengal and Burma under the powers conferred by Section 1, Act I of 1870, with the previous sanction of the Governor-General in Council, to protect their ports from being regarded by the European Powers as infected, prescribe fifteen days' quarantine for all vessels in which a case of plague is found on arrival, or on which it is believed that a case has occurred during the voyage, with this exception, that the rules for Calcutta apparently prescribe only eight days' quarantine in the latter case. In the Bombay Presidency all the principal ports are infected, and the Government of Bombay have issued special rules regarding inspection, segregation, and disinfection at these ports. Under the rules of the other maritime Governments no communication may be held with other

boats or vessels or with the shore while the vessel remains in quarantine, but the Health Officer may direct the removal of so many of the passengers and crew as may not be suffering from illness, and whose services may not be required on board, to places of segregation on shore where they are required to complete the period of quarantine. If a case of plague occurs while the quarantine is in progress, quarantine recommences for a further period of fifteen days.

The period of fifteen days' quarantine was fixed in view of the possibility that some of the Governments in Europe might not regard quarantine as effective if it were prescribed for a shorter period, but now that the Conference has authoritatively pronounced that the period of incubation may be taken at ten days, the period of observation should be reduced from fifteen to ten days. The quarantine rules in the case of vessels on which there is a case of plague at the time of arrival, or on which it is believed that a plague case has occurred during the voyage should also be modified in accordance with the regulations framed by the Conference for infected vessels. The Government of Madras have already revised their rules in a similar direction. The Governor-General in Council lays special stress upon the undesirability of detaining the sick and healthy on board-ship together. The sick should be landed and treated in an isolation hospital, and the healthy should be landed and detained under observation in suitable segregation shelter for a period of ten days from the occurrence of the last case. The disinfection and other precautionary measures prescribed by the Conference should also be complied with.

The quarantine rules framed by the Maritime Governments differ somewhat from one another as regards the treatment of vessels on which no case of plague has occurred during the voyage. Their general purport is to the effect that eight days' quarantine may be imposed at the absolute or limited discretion of the Health Officer unless *pratique* has been granted at Colombo or some other intermediate port.

The maximum period of detention of a vessel on which the Health Officer is satisfied that no case of plague has occurred should be ten days from the date of departure from the infected port. If the Health Officer is not satisfied that there has really been no case on board, or if ten days have not elapsed since the date of departure from the infected port, the vessel may be detained, at his discretion, up to this period. In any case in which a vessel is given free *pratique* less than ten days after her departure from the infected port the Health Officer should be empowered, on the analogy of the rules for the observation of persons travelling by railway, which have been framed by several of the Local Governments, to detain under observation in a suitable place of segregation, up to a

maximum of ten days from the date of the departure of the vessel, any person landed from the ship whom he may consider to be in any way likely to carry infection. Any articles of clothing or other effects belonging to the persons detained or to other persons, which by reason of their dirty condition or otherwise, may be considered likely to be contaminated should be disinfected. Discretion may be given to the Health Officer to apply the other provisions regarding disinfection, etc., prescribed by the Convention in the case of suspected ships. The Local Government may also make such arrangements as are possible for the surveillance of persons who are not detained on arrival at their destination. Free pratique granted at Colombo or other intermediate ports should be recognized.

The Government of Bombay have at present under consideration the revision of the rules for the port of Aden. In making this revision the conclusions of the Conference should be borne in mind. In view of the position of Aden as the port of call for Europe the existing rule which refuses pratique to all vessels until ten days from the date of their departure should be maintained.

LONDON LETTER.

In a former letter I mentioned the formation of the Clinical Research Association, whose purpose is to assist medical practitioners in those special scientific investigations pathological, bacteriological and clinical without which, in these days, the practice of medicine is blind and inept. From the second annual report of the Association, which has recently been distributed, it is evident that the scheme has become a great success and supplied a decided want. The list of subscribers is now not far short of 2,500, and they belong to all parts of England, Scotland and Ireland. Membership, for which the fee is one guinea, entitles to have work done at considerably lower charges, and to receive bottles and boxes for transmitting specimens, but the Association is open to all, and the terms for the various examinations made, which of course vary considerably according to the nature of them, are very moderate. For example, a member may have phthisical sputum examined for 2s. 6d., diphtheritic membrane for 7s. 6d., urine analysed qualitatively for 3s. 6d., and quantitatively for 5s., a Röntgen photograph taken for 10s. 6d., and material analysed for poison for £2 2s.; the same work being done for non-members at 3s. 6d., 10s., 5s., 7s. 6d., 15s., and £3 3s. During the year 1896, 7,227 investigations were made, 1,500 of these were analyses of urine; 908 examinations of diphtheritic membrane; 2,417 of sputum and a large number of specimens of water, milk, and other materials were dealt with chemically and bacteriologically for various purposes. The help which these enquiries must

tender to medical men who have not the time, the appliances, nor the aptitude to conduct such researches, is of incalculable value, and the standard of practice must be greatly raised by his enterprise.

The report deals with the work of the year in a very instructive fashion commenting on the nature, result, and use of the chemical, microscopic and other processes resorted to, and pointing out difficulties, doubts, advances and desiderata in the light of the present scientific status. It also gives instructions for the selection and transmission of specimens. It is very significant of the value which the profession and public attach to these proceedings that some of the high class London chemists have organised laboratories in which similar work may be done on reasonable terms. The preparation of serums and animal extracts has also become a substantial branch of the trade. In this line the well-known and enterprising firm, Messrs. Burroughs, Wellcome and Co. are well to the front.

Two deaths have recently taken place in this country which merit prominent notice in the *Indian Medical Gazette*. One is of Surgeon-General James Tyrell Carter Ross, F.R.C.S., which occurred at Rhyde on the 27th of April. This officer is best known as an energetic and popular Secretary of the Bengal Medical Department and editor of the journal during the years 1868-69 and 70. Having succeeded him in both these offices, I know well how he put his heart and soul into his work and strove to maintain the honour and efficiency of his department at a time when many influences were in operation to reduce its prestige and limit its usefulness. Ross was born in 1823, and had therefore at the time of his death completed 74 years. He studied medicine in St. George's Hospital School, and entered the service in 1845. For the greater part of his career he was employed on the N.-W. Frontier. He took part in the Sutlej campaign, and subsequently in the mutiny operation. He was appointed Civil Surgeon of Simla and subsequently selected by Inspector-General of Hospitals J. Murray as his secretary. He drew up some admirable reports of the native army, civil dispensaries, vaccination and lunatic asylums, and strove to infuse a spirit of enthusiasm and energy into the medical executive of all grades. He devoted much time and labour to his editorial duties, and the volumes of this journal which he published present a very interesting view of the events, scientific and administrative of the time. On his promotion to the rank of Deputy-Surgeon-General he volunteered for service and was appointed Principal Medical Officer of the Force that was sent against the Duffla Hill tribes. The remainder of his service was spent in charge of the Saugor Circle of medical administration. He retired in 1877, and subsequently proceeded to South Africa for the purpose of superintending nursing arrangements.

in the Zulu Campaign. He obtained the Empress of India Medal in 1877, and was made Companion of the Order of the Indian Empire in 1878. Ross without being a brilliant or talented man was endowed with ambition, energy and common sense, and these qualities, coupled with a high sense of honour and love of his profession and service, rendered his life stirring, useful and productive. Deputy-Surgeon-General Henry Vandyke-Carter, M.D. (Lond.), who died of phthisis at Scarborough on the 4th of May, *æt.* 66, was a great man, and has left an enduring mark on many fields of research. Son of an artist he employed his pencil, as well as his scalpel, microscope and pen to good effect, and behind these gifts of demonstration were the enquiring mind, indefatigable industry, and highly cultivated faculties of observation and reasoning.

He studied in University College, London, and was employed as Demonstrator of Anatomy in St. George's Hospital School before he entered the Bombay Medical Service in January 1868. It was while working at St. George's that he executed those illustrations of Gray's Anatomy, which so many generations of students have found so valuable and helpful. Soon after arrival in India he was appointed Professor of Anatomy and Physiology in the Grant Medical College and 2nd Surgeon of the Jarnsetjee Jhejeebhoy Hospital. He was also Curator of the College Museum. He subsequently was appointed Civil Surgeon of Satara and Superintendent of the Gaol. In 1872 he took furlough and employed his holiday by visiting Norway, Italy, Greece and other places in order to study leprosy and the disease now known as oriental sore. On his return to India he was deputed to investigate leprosy in Kathiawar, and afterwards to enquire into the nature of the fever which raged during the great famine of 1877-78. He identified it as relapsing fever, and discovered the spirillum which had previously been described by German observers as inhabiting the blood in this disease. This work on spirillum fever is a standard one. He suffered twice from this fever, and was obliged to take sick leave in 1882-83, during which time he devoted himself to literary and scientific work. During the later years of his service, he filled the important office of Principal of the Grant Medical College and 1st Physician of the J. J. Hospital. He retired in July 1888. In addition to leprosy, Delhi boil and spirillum fever, Carter also worked at mycetoma, lymph scrotum, typhoid ulcers, chyluria, "surra," the malarial parasite, and other pathological subjects. Whatever he did was well done, and his contributions to medical science are good in quality and quantity. On leaving India he was awarded a lectureship in Physiology. He was awarded the Stuart Pathological Prize by the British Medical Association, was appointed Honorary Surgeon to the Queen, and promoted to the rank of Deputy-Surgeon-General in 1890.

These rewards appear very paltry in view of the distinguished public labours, and eminent services to science wrought by this gifted and most diligent man; but if he did not receive decoration or title, he earned a nobler recompense in the admiration, gratitude and respect which have been, and will continue to be, accorded to his life and work by those who know them best.

14th May 1897.

Transactions of Medical Societies.

THE BOMBAY MEDICAL AND PHYSICAL SOCIETY.

The monthly meeting of the Bombay Medical and Physical Society was held in the Durbar Room, Town Hall, on Friday, 2nd April 1897, at 4-30 P.M.

Present: Brig.-Surgn.-Lieut.-Col. J. Arnott in the chair.

Papers were read by—Surgeon Captain S. E. Prall, on 'A Case of Traumatic Axillary Aneurism;' by Staff-Surgeon P. W. Bassett-Smith, on 'Dengue Fever in Bombay;' by Surgeon-Captain L. F. Childe on 'The Pneumonic Type of Plague;' and the report of a case of small-pox occurring a few days after anti-plague inoculation was communicated by the Secretary for Mr. Haffkine.

CASE OF TRAUMATIC ANEURISM OF AXILLARY ARTERY.

By Surgeon-Capt. S. E. Prall.

A.B., male, aged about 27, admitted to Karwar Civil Hospital with the following history:—

One month previously he had been sitting in the jungle watching another man drive an iron wedge into a teak log. The wedge flew to pieces, and a small piece entered A.B.'s shoulder on the posterior aspect with great force and entirely disappeared. The wound of entrance healed quickly and the man forgot all about it till a week afterwards, when his arm began to swell and to give him pain. Both swelling and pain began in the axilla rapidly involved the whole arm.

On admission, very emaciated and weak. Foul tongue, temperature 100°; left arm, forearm and hand enormously swollen from œdema, and the fingers commencing to blacken; and in the axilla a rounded elastic swelling about the size of a Dutch cheese, very tense, non-pulsating. Pulse at wrist just perceptible. Small patch of ulceration over humeral insertion of deltoid muscle at anterior border.

Diagnosis: Axillary abscess probably.

Remarks.—A small incision was made parallel to anterior border of deltoid and at a depth of $\frac{1}{4}$ inch or less fresh blood clot was exposed. It was immediately obvious that the case was one of traumatic aneurism, and the incision was therefore enlarged upwards in the same line for about $2\frac{1}{2}$ or 3 inches with the object of turning out the clot and getting hold of the end of the artery. The clot was very carefully removed, and the artery began to bleed as we reached the innermost layers of clot. These layers were quickly turned out and a couple of sponges rapidly inserted and held forcibly by my assistant against the upper end of the cavity to arrest the hæmorrhage, which they did effectually.

Question then what to do next?

The artery had been wounded so high up, and there was evidently so much destruction of tissue in the neighbourhood of the arterial lesion (where by the way I found the bit of steel or iron that had caused the injury—a sharp-pointed splinter—about $\frac{1}{4}$ inch in circumference) that it was impossible to pick up the artery there. Ligature of the subclavian in its third part was rendered almost impossible by the fact

that when we turned the patient's head to one side to do the operation, he stopped breathing. I therefore determined to try for the first part of the axillary below the clavicle, and having cut the junction of the deltoid and pectoralis major muscles by an incision in the direction of their fibres commencing from the clavicle. I secured the artery without any trouble, and found on cautiously removing the sponge plugs that the hemorrhage was entirely arrested. The arm was carefully rubbed with warm oil and bandaged in cotton-wool to a pillow, and the aneurism cavity stuffed with strips of lint, oiled and iodofomed. For several days after the man did well, and the gangrene of the fingers did not seem to progress. Then, however, gangrene set in, and I was compelled to decide whether I should amputate at the shoulder or not, amputation lower down not seeming to be of any use. I decided that my patient was so reduced that he would probably die on the table, which is an event that is enough to ruin the surgical practice of a country civil hospital for an indefinite term. He died on the 10th or 11th day.

There seem to be three points about this case for discussion:—

1st.—How could one distinguish between an abscess and an aneurism under similar circumstances, bearing in mind the tension that existed. I certainly felt the pulse at the wrist before the operation, and I thought the lessening in its volume was due to compression by pus. Again, abscess was at least the more probable occurrence after the entrance of a dirty piece of iron. Thirdly, the feel of the non-pulsating tumour was not at all inconsistent with the supposition that I was dealing with a very tense bag of fluid.

2nd.—The case with which one can secure the axillary artery below the clavicle.

3rd.—Question whether the treatment undertaken was not entirely wrong and amputation at the shoulder the correct treatment in the first instance.

DENGUE FEVER IN BOMBAY.

By Staff-Surgeon P. W. Bassett-Smith, R. N.

During the time I have been stationed in Bombay, from 1st October 1895 to the present, March 1897, attached to the fleet for the defence of India, the fevers which have prevailed among the ship's company have given me a great amount of interesting matter, among them the particular type that it is my object here to describe. Very early the conviction was forced on me that, besides the ordinary attacks of febricula and remittent fevers, there was an intermediate form which lasted about a week, leaving considerable debility and anemia afterwards, but it was not until this last winter the true character became apparent to me, namely, that the disease is a mild form of "Dengue," with very slight degree of bone and muscular pain. This masked character has frequently been noticed before, and has led to great difficulty in the diagnosis.

Dengue fever has not a long record. The earliest accounts are in 1779, when it prevailed in Batavia and Egypt; it then spread to Zanzibar and India on the west coast. In 1818 to America. In 1824-25 it was epidemic on the east side of India, spreading to Burma on the one side and to Gujerat on the other. Since then there have been many epidemics both in the eastern and western hemispheres. About 1870 there was a severe epidemic in which Bombay suffered. Egypt, however, seems to be particularly favourable for its development, and Dr. Sandwith of Cairo states that dengue is met with in a sporadic form in Egypt every year, but that it is of milder form, and that the rheumatic element is less marked than elsewhere. In 1887 the rash was a very marked feature, the army surgeons calling the disease scarlet fever; last year, 1896, some have called it *rotheln*. Then it began at Ismailia and Port Said about August, and was more prevalent among the Europeans than the natives; severe cases were rare; the eruption more resembled *rotheln* than measles or scarlet fever. This epidemic stopped in December. Its chief characteristics were suddenness of onset, severe pain in the head, eye-balls and the muscles, with the appearance of an eruption about the 3rd day when the fever had almost or entirely gone. (*Lancet*, Dec. 26th, 1896.) Here in Bombay we had a well-marked rash of cases in the months of October and November 1895; a second epidemic in July and August 1896; and this last winter in the latter half of November, December and first half of January a third. Surgeon-Lieutenant-Colonel Galloway, A.M.D., told me that they had an exactly similar fever very prevalent at Colaba among the Irish Rifles during the early winter months of 1895-96, that is, soon after our first epidemic on board.

From my experience it is difficult to find any climatic cause for the outbreaks, the first being in the hot dry months of October and November, when the ships were out in the stream

with abundance of fresh air; the second when they were moored alongside the jetty at Prince's Dock, in the middle of the wet monsoon; and this last one in the exceptionally cold winter months we have lately experienced. With regard to the latter, about 230 men having just come out from England to relieve those who had been out here 18 months, they had passed through Port Said at the time of the above quoted epidemic there, and had been granted leave on shore. Immediately on joining this ship they and they only went down with the fever rapidly, the men who had been out for some time being quite exempt. The type of fever, though very closely resembling what we had experienced before, had points of difference, being much more in accordance with that present in Egypt, chiefly in the presence of a well-marked eruption; so that though the disease is no doubt present in Bombay, and in this hulk, fresh infection seems to have been brought out last autumn, probably remaining dormant until the men reached here, when conditions were favourable for its development. The infection appears to be as diffusible as that of influenza, to which the disease bears a strong resemblance, for almost every one, officers and men, suffered, medical officers and nurses included. At first I tried to trace the cause of this fever to exposure, chills, etc., but without any distinct results. A very small percentage took the disease twice; those who fell ill in July and August being either ones who had not taken it in the winter, or men who had joined the ship in the spring, so that one attack would seem to give protection against a second.

The prominent symptoms as experienced here are a rapid onset of fever lasting three or four days with a more or less perfect remission, then a secondary and shorter fever, followed by a period of two or three days with a subnormal temperature. At the same time there are severe frontal headache, pains in the back and thighs, and in a certain number of cases an eruption either with the primary or secondary fever or with both, generally of a very evanescent character. Taking the most prominent features in detail, the fever is sometimes ushered in by slight shivers, always with intense headache. The onset is generally sudden, on the first evening the temperature being between 102° and 104°. The pulse is rather fast and peculiarly hard, the urine high-coloured, tongue coated with more or less thick fur, and the bowels are constipated. The temperature may remain up for two to four days, showing slight evening exacerbations; but very frequently there is a steady fall, taking two or three days to reach normal or nearly so, when the patient feels almost well. After a very short interval, generally on the 5th day, the secondary fever comes on, sometimes the temperature rapidly running up as high as in the primary, at others abating altogether. The subnormal period is always present. Rigors and severe sweats were never noticed. The skin at first is harsh and dry. At the end of the disease the tongue is large, flabby, coated and indented by the teeth; in only those with prolonged primary fever was the tongue dry, or bilious vomiting present. In a few cases, however, the whole tongue was abnormally red.

Pain.—The headache, pain in the eyeballs, and back-ache were always very marked, and reminded me of influenza; during the period of apyrexia they usually abated; but never was there any break-bone pain or severe joint pain. In 1853 Goodeve states that at Calcutta severe pains were rarely present.

Eruptions.—These have been most unusually absent, at least during the first two epidemics. In 1895 I did not notice any, but Surgeon-Lieutenant-Colonel Galloway told me he found it frequently. In the summer of 1896 only in three cases was any noticed; one having flushed face and suffused eyes, the second with an urticarial eruption on the forearms, the third had an erythematous rash on the arms and the face. In this last outbreak the rash has been much more frequent, about half the cases in December and as many in January. In these it was nearly always of a distinct scarlatiniform character, the favourite seats being first on elbows, outer sides of forearms and the front of the thighs, particularly over the knees. From here it might spread over the arms, trunk, thighs and face. Generally it was very slight, lasting often only a few hours (hence, perhaps, often missed); sometimes leaving a mottling of the skin, but I never have seen any desquamation. Itching both before and after its appearance was not uncommon. The time of the eruption was very uncertain; it was sometimes with the primary fever, at others with the secondary, and sometimes after all fever had passed away. There never was any sore-throat or coryza. No enlarged glands were found anywhere, and beyond the anemia and debility there were no consequences.

Prognosis was good; each case lasted from one week to ten days with one week's convalescence or less.

Treatment.—Quinine was quite useless, only disturbing digestion; aconite had no effect on the course of the fever. Simple diaphoretics with antipyrin when the fever ran high apparently answered best, with local applications to the back to relieve pain there.

I have brought this forward before the Society in the hopes of hearing whether other members of the profession in prac-

tice on shore have met with a disease presenting the same characters. The diagnosis is difficult owing to the mildness of many of the cases; it was only by 'charting' every case of fever that the peculiar features became apparent to me, and for the first year I looked upon it as a mild form of a relapsing fever endemic in Bombay. I have examined the blood in a large number of cases both during and after the fever, but so far have been unable to detect anything distinctive. The peculiar regularity and periodicity lead one, however, to think that some living organism is at the bottom of the disease, going through a cycle of changes as the miasmatozoon of malaria is said to do.

Dr. ARNOTT said: That in connection with the outbreak of dengue on board the *Tenassarim* it might be interesting to record that some time ago—he did not quite remember the date, but it was about 5 or 6 years ago—there was an outbreak of dengue in the same ship, and he, along with the late Surgeon-Major Mansor, was directed to report on it. The symptoms were more pronounced than those described by Staff-Surgeon Bassett-Smith—more frequent eruption, more marked pains, &c., and nearly the whole ship's company were affected. About the same time Dr. Arnott had some cases on shore:—One a lady on Malabar Hill, who had very pronounced symptoms, severe pains, slight sore throat, very copious eruption resembling scarlet fever, and as a sequela enlargement of the glands of the back of the neck; and another case just like this but without the glandular sequela. There was also a similar case in the European Hospital.

More than 25 years ago, when the epidemic of dengue described by Dr. Christio at Zanzibar as 'Hidenja Pipo' spread to Adon and thence to Bombay, the old steamer *Dalhousie* brought troops to Bombay, among whom there were cases of dengue. The ship was sent to the other side of the harbour and disinfected. Afterwards she conveyed troops to Cannanore or some other port on the Malabar Coast, and dengue broke out among them.

THE PNEUMONIC TYPE OF PLAGUE.

By Surgeon-Captain L. F. Childs.

Mr. President and Gentlemen,—When plague appeared in Bombay, and as the disease developed, one was struck by the following facts:—First, in all published accounts of the disease, although the ordinary phase of the malady, *viz.*, plague with buboes, is principally described, still mention is always made of another and more fatal form without buboes; whereas here in Bombay it seemed as if the bubonic form were alone appearing, for at the beginning one saw no examples of the other form. Then one observed that coincidently with the increased death-rate due to plague, there was a large and unexplained increase assigned to remittent fever and respiratory diseases. Week by week as the plague mortality increased, so did that under these two headings, and though it was possible that all these were cases of known but concealed plague, still one could not help suspecting that some of them might be due to plague which was not diagnosed because of the absence of buboes. So I resolved to examine the bodies of all hospital patients who had died of fever, pneumonia, or any acute illness, to see if there were evidences that any of them had really died of plague. And at the end of December I met with a case which had been diagnosed as

but which turned out to be one of plague without causing any marked enlargement of the lymphatic glands—a case, in fact, of plague-pneumonia; and as this *post-mortem* is exactly like many others that I have since made, and is typical of the disease, I will read a few notes of it.

B. L., Hindoo, male, 25 years old, admitted for fever and cough on December 26th, 1896, under Dr. S. He said he had been ill for about seven days. He had symptoms in the chest which led to the diagnosis of broncho-pneumonia being made. No lymphatic glands were found to be enlarged or painful, and a specimen of blood taken by Dr. S. showed no plague bacilli under the microscope. He coughed up about 2 ounces of blood-stained fluid on the night of 27th, and died at 3 A.M. on December 28th.

Post-mortem on 28th December, 7 hours after death.

Lungs.—Much general engorgement and oedema, with sero-sanguinous frothy fluid in the bronchi but no pus; and the usual appearances of acute bronchitis were absent. There was one small pneumonic patch, the size of a walnut, in the early second stage, situated a little below the apex on the front of the right lung; and two similar but smaller patches at about the same part of the left lung. These patches stood out a little from the surface and were light-grey in colour, airless, friable, and sank in water; and each was surrounded by a dark ring of engorged lung in the first stage of pneumonia, which merged into healthy lung; there was some recent pleurisy over the pneumonic areas. All the other organs were examined, and showed considerable engorgement, but no special lesion was observed.

Condition of the Lymphatic Glands.—The bronchial were quite small and of normal appearance; the cervical were slightly enlarged, but pale and not engorged; the axillary were pink and slightly enlarged; the left iliac were somewhat large, red and soft; the lumbar were rather swollen but pale; and all the other glands looked absolutely normal. Cultures were made on agar-agar from the pneumonic lung and spleen, and ultimately a pure growth of the plague bacillus was obtained from each.

Microscope.—The pneumonic patches in both stages showed an immense number of plague bacilli, and the rest of the lung showed a large number; the left supra-trochlear and the left femoral glands showed a fair number, and all the other glands extremely few; the spleen and blood also showed a few.

So this was a case of plague, in which during life all the symptoms pointed to disease of the lungs, and in which there were no evidences of glandular enlargement, whilst after death there was clear proof of enormous growth of plague bacilli in the lungs, and of only very slight growth in the lymphatic glands.

I have made up to the present twelve *post-mortems* on such cases, all presenting appearances similar to the above; and I may add that all the patients were brought to hospital by their friends, supposed to be suffering from cough and fever, and, as far as I know, they were quite unaware of the nature of the disease. I have also to say that in nearly all the other cases the fluid from the trachea or bronchial tubes has also been examined; it shows an immense number of plague bacilli, and cultures of plague can always be obtained from it. And that Professor Haffkine has examined some of these cases and Professor Bitter others, and both have confirmed the results stated above with regard to the clinical symptoms of these cases. It fell to me to attend on the late lamented Surgeon-Major Mansor, and as he died of this form of plague, I will mention a few facts about his case. He was in his usual health on January 2nd, and had a sudden rigor in the morning and felt fever coming on. During the day a bad headache developed, he felt nausea and vomited several times, and he had pains and a tired feeling in his limbs; his tongue remained clean and moist and his skin was slightly moist. At 2 P.M. temperature 103.4°, pulse 116, respirations 25, and there were but slight variations during the day. On January 3rd had passed a bad night, and felt worse, and all the symptoms persisted except the aching in the limbs, and he felt very ill. The temperature remained between 103.5° and 104.5°, pulse about 110, and respirations about 23 throughout the day; during the afternoon he felt some pain at the lower part of the left axilla just under the anterior fold, but there was no glandular enlargement or pain in the glands anywhere. On January 4th had passed a bad night and felt very ill, temperature 104.6°, pulse 113, respirations 25, tongue still moist, with a little fur behind and no sores about the lips or teeth; the other symptoms as before. During the night he began to cough and brought up some watery sero-mucous fluid, slightly blood-tinged, and the pain remained in the same place, only more diffused now, being felt over an area of a square inch. At this part some moist sounds could be heard like those of early pneumonia, and they could also be heard just below the left clavicle; the rest of the lungs and other organs appeared to be normal, as did the lymphatic glands. Patient considered that he had pneumonia, but the symptoms were not like ordinary pneumonia; for the onset was different, the condition of the tongue and mouth different, there was no dyspnoea or pneumonic disproportion of pulse and respiration, and the sputum was not at all like rusty sputum; for it was loose and free, coming up with the slightest cough, it was watery, looking more like serum than mucous, and it was slightly pink, not rusty yellow at all. Also there was the striking fact that the patient's general condition was far worse than could be explained by the small amount of lung-disease present. So I examined the sputum under the microscope, and found it full of bacilli looking like those of plague, and cultures were made from which a pure growth of the plague bacillus was obtained. During 4th and 5th patient became steadily worse, his temperature remained about 104°, and his expectoration became most profuse; the moist sounds were heard over a larger area, as well as slightly at the bases; the respirations increased to 35, and then to 45, and the pulse to 120 and 135; and he ultimately died early on January 6th.

There is also the case of the nurse who attended him, who unfortunately died of a similar form of plague. In brief, she became ill on the evening of January 7th, and showed symptoms of pneumonia on January 8th; she rapidly became worse and died on the 10th, but her sputum was not nearly so profuse as in the former case, and symptoms of exhaustion came on much earlier. She also had no glandular pain or enlargement whatever, and bacteriologically her sputum was exactly as described above.

And these cases led up to a matter that I should like to bring before the meeting, and that is the question of the

Current Medical Literature.

MEDICINE.

APPENDICITIS FROM A PHYSICIAN'S POINT OF VIEW. BY J. F. GOODHART, M.D., F.R.C.P. *The Practitioner*.—Dr. Goodhart is under the impression that appendicitis is actually becoming more common, and that the increase is not solely due to improved diagnosis. In this he thinks it resembles diphtheria.

As causes of increase in frequency he alludes to the theory that the appendix may be tonsillary in its affinities, and the inflammation of the appendix may be of rheumatic origin. Also he refers to the suggestion that it may be a germ disease, e.g., bacillus capitis coli, which is becoming commoner like certain other disease germs. He acknowledges that fecal concretions are often found in the appendix, and that they are often associated with inflammation, ulceration or even gangrene of that body.

He divides cases of appendicitis into three groups, and he bases this classification largely on symptoms and treatment. There are the acute cases that rapidly subside, "not unlike a rheumatic tonsillitis; there are the cases in which there is more or less local thickening, and evidence of local peritonitis, and, lastly, there are those which tend to recur or relapse.

"Up to a certain point all cases need to be treated alike. For in any given case, so long as the acute symptoms are present, one must act as if acute peritonitis were imminent, and no one can foretell what will be the next move."

In sudden, acute cases he advocates bed, milk and water diet, the local application of leeches or of an ice-bag. He strongly recommends the judicious use of opium, or of calomel and opium, in spite of those who say opium masks the symptoms or pens up the bacterium coli commune and its products. In the early days he avoids even mild aperients, though he sanctions the use of salol or salicylate of soda.

In those cases that go on to abscess formation he agrees with Treves that operation is seldom required before the fifth day.

In cases of the relapsing type there is frequently a small abscess that has never properly resolved. These should be explored in the quiescent state, and the appendix should be removed to prevent further risk of inflammation.

PERCUSSION AND PALPATION. BY R. MAGUIRE, M.D., F.R.C.P. *The Practitioner*.—After discussing the resistance experienced by both the percussing and percussed finger, Dr. Maguire proceeds to emphasise the value of the resistance perceptible by mere palpation in the mapping out of the thoracic and abdominal viscera.

"If the finger pressing lightly be passed over the surface of the chest, ignoring the bony or cartilaginous projections, there will be felt here and there to be a slight change of sensation, but such as is readily appreciated by the finger. Until one is practised in the method it is well to place the first and second fingers of the right hand on the chest wall, and then, in any desired direction, palpate with slight pressure alternately with each finger. Let any of my readers do this in the left parasternal line (one inch and a half outside the border of the sternum) and compare the resistance felt in the first and the fourth intercostal spaces. He will be conscious of a decided difference, the fourth space being the harder. Similarly, try the right nipple line from the clavicle downwards, and, blindfolded, he will in a normal subject detect the resistance of the liver. In the right scapular line behind, the liver resistance will be felt easily at the tenth rib. The pressure must be light, and after a very little practice it is not necessary to use the alternate palpation described. In the ordinary examination of the chest, during inspection one usually places the hands on the upper parts of the chest in order to better observe the respiratory movement. If the hands be then gently moved down the chest wall the differences of resistance can be detected easily. The ribs and sternum are only slight obstacles. Compare the resistances of the second rib with the seventh rib in the right nipple line or that of the sternum just above the second costal cartilages and of the same bone between the fifth cartilages, and differences will be obvious, * * * I have, then, quite convinced myself of the accuracy of such palpation, not only in chest, but also in abdominal examination. It must not supersede percussion and other methods of observation, but it is at least a valuable control of these. I believe, further, that it is superior to percussion in delicacy and accuracy."

TREATMENT OF TUBERCULOSIS. BY E. A. EDLEN, M.D. *The New York Medical Journal*.—Dr. Edlen strongly recommends the use of creasote, guaiacol, and strychnine in phthisis. As it is important to avoid disturbance of the digestive organs, and as creasote is apt to do this, he is in the habit of prescribing creasote in a combination that he finds rarely upsets digestion:—

R	Creasoti fagi	...	...	Si
	Guaiacol	...	...	Siiv
	Alcohol	...	...	Siiv
	Glycerini	...	...	Siiviii
	Extr. Aurantii fl	...	...	Siiv
	Saccharini	...	...	grs. xv
	Vinum Xerici	...	...	ad O ii

Sig.—Two drachms in a glass of water after meals. Increase by one drachm a day up to one ounce at a dose.

Strychnine he considers a valuable adjunct to the above formula. The other remedies he

regards with favour are: Iron, quinine, and arsenic in anæmic subjects; hydriodic acid in serofulous subjects; protomucin and nuclein in cases with diseased kidneys, and when creasote is not well tolerated.

TREATMENT OF EPILEPSY. By W. X. Sudduth, M.A., M.D. *Medicine*.—Dr. Sudduth relies more on diet, and mental and moral hygiene for the treatment of epilepsy, than he does on drugs. His notions of epilepsy seem peculiar; he regards it as "a disease of consciousness," and he considers it "primarily a functional nervous disorder. He lays great stress on "fear" as a cause of epileptic seizures. He believes that successful treatment depends on establishing better emotional control. This is to be obtained by suggestive therapeutics, by a new environment and associations, by good hygiene and diet.

"Successful treatment invariably involves the establishment of moral hygiene on a rational and persistent basis. A regular system verging on military discipline must be established—regular hours for rising and retiring, regular times for meals, which should be more frequent than ordinary (about two hours apart during the waking hours), regular times for study, exercise, and sleep. All the activities of the patient should be as regular as clockwork and no interference be permitted. Nothing serves to establish emotional control better than regularity in occupation, which should be varied as frequently as is necessary, not at the caprice of the child, but at the direction of the teacher, who must be keen to anticipate fatigue of attention on the part of the patient. * * *

"Methods of relaxation should also be taught and put into practice whenever it is noticed that the child is becoming nervous and shows a lack of emotional control. * * *

"In all cases in which it is difficult to teach relaxing exercises, where no objection is raised, hypnotic suggestion should be resorted to and the patient taught autohypnotization, so that he can relax instantaneously at will. * * *

"In all extreme cases hypnotization should invariably be resorted to, since it offers the surest and quickest mode of relaxation." * * *

EPILEPSY AND EYE STRAIN. By J. S. Kirkendall, M.D. *The New York Medical Journal*.—Believing that many troubles of the nervous system are caused by peripheral irritation, and that eye strain is one of the most important etiological factors, Dr. Kirkendall has examined and corrected the vision of several epileptics, with most striking results. Three of the four cases of epilepsy which he describes were greatly improved after the defects in vision were remedied by suitable spectacles.

TREATMENT OF INSANITY BY HYPNOTIC SUGGESTION. By T. B. Keyes, M.D. *Pacific Medical Journal*.—

"1. Therapeutic hypnotic suggestion cannot be substituted as a general means of cure, owing to the difficulty of hypnotizing the insane.

"2. Hypnosis succeeds most readily in the hysterical and epileptic, on account of the ease with which hypnosis is effected.

"3. The most certain results of hypnotic therapeutic suggestion have, up to the present time, been obtained in the psychoses depending on hysteria and dipsomania.

"4. Hypnotic suggestion may be employed when the insane submit to it of their own accord, and derive benefit from it. The physician should use it with great caution, and take account of the hurtful effects which, in certain cases, may be produced.

"5. Therapeutic suggestion made in the waking state is the most reliable and effective means of cure in mental disease, and to it almost solely are due the beneficial effects of the asylum.

"6. In cases of melancholia without delirium, cases of fixed ideas, cases of alcoholism and in slight forms of stupor, suggestion methodically repeated in the waking state, in order to combat the morbid phenomena, may prove effectual.

"7. In chronic forms of paranoia suggestion has never given favourable results, owing, perhaps, to the difficulty of hypnotization."

D. M. MOIR, M.A., M.B.

OBSTETRICS AND GYNÆCOLOGY.

CONTRIBUTIONS TO THE KNOWLEDGE OF THE PLACENTA AND THE MATERNAL STRUCTURES ENTERING INTO THE FORMATION OF THE FŒTAL MEMBRANES. (*Amer. Journal of Obstetrics*).—These contributions treat two much debated obstetrical themata—the directions of placental growth and the cause of placenta prævia. Herf attacks the view lately favoured by Keilmann that the reflex placenta forms the origin of the permanent placenta. The author had occasion to make a careful examination of a triplet pregnancy in the fifth month which consisted of two foetal coverings and placentae; one of these was a placenta circumvallata. The latter proves to Herf that villi outside the peripheral zone may enter the decidua vera, thus forming an additional placenta—a placenta circumvallata. This is to him sufficient proof that this pars circumvallata can only be explained through a development of the villa into the decidua vera, and from this he concludes that the direction of growth of the placenta in normal and also in pathological conditions may extend into the decidua vera. In the second part of his discourse he deals with the origin of placenta prævia, and considers the not-yet settled question whether the ovum can implant itself at the level of the os internum. By the older authors this was the theory uniformly accepted. Hofmeier, Kaltentbach and

Keilmann, however advanced, the theory that placenta prævia depends upon the extension of a placenta reflexa to and over the internal os. The latter theory Herf attacks and contradicts. The author states that the so-called lower uterine segment, as a distinct anatomical and physiological division, does not exist. The formation of the reflexa occurs by the engrafting of the ovum into the mucous membranes, and this shows conclusively that, while the ovum may fasten itself to either side, it can never locate over the os internum. The results of his investigations are comprised in the following statement: All forms of placenta prævia, but specially the placenta prævia centralis, depend upon the location and engrafting of the ovum into the uterine wall in the immediate neighbourhood of the os internum. The marginal and lateral varieties may arise from an ovum engrafted at a higher level if the growth of the villi extends toward the cervix.

KOLA DURING LABOR. (*Therapeutic Gazette.*)—Dr. F. Gundrum administered a teaspoonful of the fluid extract every hour during the labor of a patient who had recently suffered from an obstinate malarial fever, during which she had undergone a rather severe uterine hæmorrhage. Owing to an irritable stomach but little food had been taken during her illness so that she was in a condition of great weakness when labour began. The progress of the parturition was easy, and there was an entire absence of weakness and exhaustion.

PREVENTION AND TREATMENT OF PUERPERAL FEVER. (*American Journal of the Medical Sciences.*)—Saft, one of the staff of the midwives' clinic at Breslau, believes that prophylaxis against puerperal infection should consist in lessening internal examinations as greatly as possible, and in taking the greatest pains as regards antiseptic precautions in obstetric operations. He would entirely omit disinfection of the internal genital organs even in cases where infection may occur. In considering the treatment of septic infection he is led to conclude that the treatment, generally employed with active internal disinfection, is unnecessary, and possibly prolongs the fever. He also finds that in cases of pyo-salpinx irrigation of the uterus should be absolutely forbidden because of the danger of infection in the uterine cavity. The same is true of acute inflammations of the tubes and ovaries, and no irrigation of the uterus should be begun without examining the uterine appendages to determine their condition. He concludes that ordinary cases in private houses require no internal disinfection nor any internal treatment which exposes the patient to the risk of intra-uterine infection. Dr. Edward P. Davis in commenting on the above says that he cannot agree with Saft in absolutely forbidding intra-uterine treatment in septic infection;

he has seen no harm, but rather decided good follow the thorough cleansing of the infected uterus, provided this be done early in the case.

GUAIACOL IN PUERPERAL ECLAMPSIA. (*Boston Medical and Surgical Journal.*)—Appleby recommends guaiacol in the treatment of eclampsia. Forty or fifty drops were poured upon the abdomen and gently rubbed in. In a few minutes the pulse became soft, free diaphoresis sets in, and the convulsions die away. Guaiacol has the advantages of ease of application, certainty of action and speedy relief of urgent symptoms. Its physiological effect is to cause rapid and marked lessening of arterial blood pressures, lowering of temperature and free diaphoresis.

THE ANATOMY AND DEVELOPMENT OF THE HUMAN PLACENTA. (*American Journal of Obstetrics.*)—An essay of Hofmeier comprises the result of many years' study and investigation, and must be considered as a most important contribution to our knowledge of embryology. The main objects in view were the epithelium of the chorionic villi, the connection between the foetal and maternal structures, the vascular foetal villi and their relation to the maternal blood vessels. The main results of Hofmeier's investigations are in brief the following:—

1. Soon after fertilization of the ovule has taken place, the so-called syncytium is formed, which facilitates its affixation to the uterine mucous membrane.

2. Chorion and villi already in their earliest stages show a double layer of cells, the syncytium externally and the cell layer of Langhans internally. From these layers originate numerous epithelial projections which have an intimate relation to the development of the villi, and probably also with the nutrition of the ovum in its earliest stages.

3. The epithelium of the uterus (and of the tubes in tubal pregnancy) at and in the immediate neighbourhood of the point of insertion also changes into syncytium, inasmuch as the decidua encapsulates and surrounds the ovum.

4. From the terminations of the villi proliferate the so-called "cell columns" which penetrate the syncytial covering, extend into the surface of the decidua, and there form aggregations of large-celled tissue which unite with the decidua. Excessive proliferation of this cell layer upon the decidua or in the form of insular cell masses in the intravillous spaces are probably of a pathological character.

5. The intravillous space communicates with the maternal vessels as early as the third week. In exceptional cases the maternal vessels are opened by the penetrating villi.

KEDARNATH DAS, M.D.

Vital Statistics & Sanitation.

PLAGUE NOTIFICATION—No. 3.

Dated the 25th May 1897.

IN exercise of the powers conferred by section 2 of the Epidemic Diseases Act, 1897, and by the Notification of the Government of India in the Home Department, No. 302, dated the 4th February, and in supersession of Plague Notification No. 3, dated the 10th February 1897, which is hereby cancelled, the Lieutenant-Governor of Bengal is pleased to declare that all vessels and persons leaving the undermentioned ports in Bengal shall be subjected to the rules in the Regulation hereinafter set forth:—

Calcutta.	Balasore.	False Point.
Chittagong.	Chandbally.	Puri.

RULES.

1. No person shall be permitted to embark on board a vessel, buggalow or native craft, within any of the abovementioned ports bound for any port out of India, who has within the preceding ten days resided in or visited a part of India believed by the Health Officer of the Port to be infected by the plague.

2. No vessel shall leave any such port for any port out of India until she has been inspected by the Health Officer of the Port, and the master or person in charge of such vessel has obtained from such officer a bill of health in the form given below, stating that the master or person in charge, officers, crew and passengers (if any) of such vessel are free from the bubonic plague.

3. Should the Health Officer of the Port be of opinion that any person on board of any vessel so inspected is suffering from the bubonic plague, or is not free from the infection of the plague, he shall refuse to give a bill of health as aforesaid unless and until such person and all his relations and non-medical attendants are removed from the vessel to a plague hospital or place of observation appointed by Government, and such parts of the vessel as have been frequented by such person or his relations and attendants shall have been disinfected to the satisfaction of the Health Officer. If the vessel has no medical officer on board, the Health Officer shall order her to be detained for not less than ten days at the quarantine anchorage appointed by the Port Officer, and to be thoroughly disinfected before departure. If during the period of detention no fresh case occurs on the vessel, and no person on board shows suspicious symptoms, the vessel may be permitted to proceed, and if during the same period the persons detained under observation are proved not to be suffering from plague or any other infectious disease, they may continue their voyage.

4. After the master or person in charge of the vessel has obtained a bill of health or certificate under the provisions of these rules, no person or cargo shall be admitted or taken on board such vessel before she leaves the port, unless such vessel is again inspected by the Health Officer of the Port, and a bill of health obtained from such officer by the master or person in charge of such vessel.

5. No port clearance shall be delivered to any vessel bound from any such port to any port out of India unless and until the master or person in charge thereof shall produce the bill of health so to be obtained as aforesaid; and it shall be the duty of Customs officers to refuse delivery of the port clearance without the production of such bill of health.

6. The duties of Health Officers under these rules shall be discharged by the medical officers named below, or by such other medical officer as may from time to time be appointed for such purpose by the Lieutenant Governor:—

Health Officers.

Calcutta	... Port Health Officer.
Chittagong	... Civil Surgeon.
Narainganj	... Civil Hospital Assistant, Narainganj.
Balasore	... Civil Surgeon.
Chandbally	... Civil Hospital Assistant, Chandbally.
False Point	... Ditto, Jambun.
Puri	... Civil Surgeon.

Bill of Health.

This is to certify that the ship (or steamer) sailing under the flag and

+ Including officers and able-bodied seamen. under the command of master, of tons, bound for persons* and passengers and is at the time of leaving this port in a satisfactory sanitary condition, and that no case of bubonic plague exists among her officers, passengers, or crew, all of whom have been inspected by me.

† Or as the case may be. It is further certified that the town and port of are at present free from plague.

H. H. RISLEY, Secy. to the Govt. of Bengal.

EXTRACT FROM THE ANNUAL REPORT OF THE CHEMICAL EXAMINER AND BACTERIOLOGIST TO THE GOVERNMENTS OF NORTH-WESTERN PROVINCES AND OUDH AND OF THE CENTRAL PROVINCES, FOR THE YEAR 1896.

PART II.—BACTERIOLOGICAL.

MICROCOCOCCUS GHADIALII.

THIS microbe was discovered by my Assistant Dr. Ghadially and named by Mr. Hankin the "Micrococcus Ghadialii" after its discoverer. It seems to have the power of destroying the enteric microbe and its allies.

Dr. Ghadially was struck with the fact that when this microbe was present in samples of water sent for examination, the enteric microbe and its allies were never found. Another occurrence which led to investigations into the nature of this microbe, was the examination of the Chakrata water-supply. Chakrata is a station in which enteric was practically non-existent until 1887, in which year an exceptionally pure and well protected water-supply was introduced. A bad outbreak of enteric happened every year since then amongst the troops. Until Mr. Hankin's recent discoveries this fact suggested that enteric in that station had nothing to do with the water-supply. But now we know that the enteric microbe is one that flourishes in pure water and probably in pure water alone. Accordingly samples of water were sent for from Chakrata. The enteric microbe as Mr. Hankin had expected, was found in the water-supply at its source, and in the same water drawn from a cook-house tank. But specimens of this water were sent from a storage tank and from a filter, in neither of which could the enteric microbe be found.

On the other hand, the Micrococcus Ghadialii was present. Mr. Hankin suggested that the reason of this might be that the latter microbe owing to the heat of the journey to the plains had been stimulated into activity and had slain its adversary. To test this possibility Mr. Hankin asked that samples of water might be again sent from the original source, and also bottles containing equal quantities of this water from the source and from the filter and storage tank already mentioned.

The Medical Officer in charge kindly acceded to this request and sent the following samples of water:—

- (1) Water from C spring at source.
- (2) Water from cook-house tank.
- (3) Water from source mixed with water from storage tank.
- (4) Water from cook-house tank mixed with water from filter.

On this occasion no enteric microbe was detected in 1 and 2, but the bacillus coli communis and other allies of the enteric microbe were present. In the mixed water samples 3 and 4 on the other hand, no such microbes were present, thus proving that the allies of the enteric microbe had died out *en route*.

This led to a series of experiments with the Micrococcus Ghadialii which I will now describe.

1. *March 25th.*—Milk was inoculated with the enteric microbe.

March 26th.—The milk remained unclotted. Agar agar was inoculated from this milk. Colonies of the enteric microbe grew on the surface of the agar. The milk was now inoculated with the Micrococcus Ghadialii.

March 27th.—The milk had now clotted. Three tubes of agar were inoculated from the clotted milk. No colonies of enteric microbe grew on the surface of the agar, but only the Micrococcus Ghadialii.

2. *March 28th.*—The enteric microbe was inoculated into water, milk and bouillon.

March 29th.—A second generation of enteric microbe was grown in water, milk and bouillon.

March 30th.—

A.—The second generation of enteric microbe in water, milk and bouillon was inoculated with the Micrococcus.

B.—A third generation of enteric microbe was grown in water, milk and bouillon and inoculated on the same day with the Micrococcus.

April 1st.—Three tubes of agar were inoculated from water, milk and bouillon (A and B) and three agar tubes from the 1st generation of enteric microbe in water, milk and bouillon as a control.

A series of experiments were made with the view of discovering whether the Micrococcus Ghadialii had the power of destroying or of preventing the growth of the cholera microbe. The results of these experiments showed that the Micrococcus Ghadialii had no such power.

The Micrococcus Ghadialii is quite harmless. It has been injected both hypodermically and into the peritoneal cavity of rabbits and guinea-pigs without producing the least ill-effect. Dr. Ghadially swallowed two surface cultures on agar and was none the worse. It is purely of vegetable nature

and can be cultivated on a mixture of milk and agar-agar (China grass). It might therefore with perfect safety and without hurting caste prejudice be introduced into water-supplies containing the enteric microbe with the view to freeing the water of this microbe (enteric).

The subject, however, requires further investigation.

It is possible that the micrococcus does not actually kill the enteric microbe, but merely hinders its growth on agar, &c., or otherwise makes it impossible of detection.

Experiments showing the power possessed by the cholera microbe of passing through a mushak.

May 19th.—A bhisti's *mushak* was washed out with a strong solution of potassium permanganate and then with pure tap water until the water in the *mushak* showed no pink colour.

A Pasteur filter (Hankin type) was treated with permanganate of potassium and then with pure tap water until the filtrate showed no pink colour.

A *nand* was washed with permanganate of potassium and tap water until no pink colour remained.

The bhisti's *mushak* was filled with filtered well water free from cholera microbes, one gramme of solid peptone was added and the mouth of the *mushak* securely fastened. The *mushak* was then made to stand mouth upwards in the *nand* which was filled with unfiltered well water to which one cholera culture had been added.

May 20th.—Samples of water from the *nand* and top and bottom of the *mushak* were inoculated into peptone. In all these samples cholera vibrios were found to be present.

May 21st.—Samples of water from the *nand* and top and bottom of the *mushak* were again inoculated into peptone and again the cholera vibrios were present in all. In order to discover whether the vibrios passed through the pores of the leather or only through the seams, a seamless piece of leather was tested in exactly the same way, and it was found that the cholera vibrios rapidly passed through the leather into the peptone solution in its interior.

Similarly it was found that the enteric microbe also possesses this power of passing through a *mushak*. In this instance the *mushak* used had two patches in it. Examined immediately after the commencement of the experiment no enteric microbes were found in the *mushak*. Two hours later, however, the *mushak* contained the microbe.

Similar experiment were made with a leather water vessel around which towels washed in water containing cholera microbes were wrapped (after having been dried and again moistened). It was found that the cholera microbe rapidly passed through the leather vessel into the peptone solution within.

The experiment already described was also made with a *mushak* to the outside of which after thorough cleansing with permanganate of potassium, a 5 per cent. solution of perchloride of mercury in methylated spirit was applied and allowed to dry. It was found that the perchloride as applied had no power to prevent the passage of cholera vibrios from the *nand* into the interior of the *mushak*.

These experiments show how readily *mushaks* might become infected from a bhisti's loin cloth.

Experiments with surahis showing the power of cholera vibrios to pass through earthenware vessels.

June 29th.—Three *surahis* marked 1, 2 and 3, were filled with pure well water. *Surahi* No. 1 was made of kankar, No. 2 of red earth, and No. 3 of pipe clay.

A piece of cloth about two yards in length was wetted in well water in a *nand* to which one culture of Haffkine's second cholera vaccine had been added.

Each of the *surahis* was wrapped round with a piece of this cloth and placed on a shelf.

The temperature of the room was 33° e. at 11 A.M.

The temperature of the water in the *surahis* was 29° e. at 11 A.M.

Water from each of the *surahis* was inoculated into peptone at 11 A.M. and 4 P.M.

The pipe clay *surahi* allowed the cholera vibrios to pass through most readily and the kankar *surahi* least readily.

A similar experiment with the enteric microbe showed that this micro organism also readily passed through the *surahis*, being found in the water contained in the *surahis* after 24 hours.

The experiments show the danger of using *surahis* for the storage of drinking water.

Examination of a Household filter.

This filter was sent by the manufacturers for examination. The filter was tested just as received. It was not cleaned or sterilized.

June 5th.—

The filter was filled with well water to which one surface culture of Haffkine's 2nd cholera vaccine had been added.

	Vibrios.	Microbes. Per c. c.
Unfiltered water ...	+	45,000
Filtrate immediately ...	+	14,000
Filtrate an hour later ...	+	12,000

June 6th.—

Unfiltered water ...	+	18,000
Filtrate No. 1 ...	+	25,000
Filtrate No. 2 ...	+	20,000

June 7th.—

Unfiltered water ...	+	25,000
Filtrate No. 1 ...	+	15,000
Filtrate No. 2 ...	+	12,000

The experiment shows the worthlessness of this filter.

Examination of an 'Improved Household filter' (Imitation Pasteur filter.)

This filter was also sent by the makers for examination.

July 28th.—

The filter was examined just as received. It was not cleaned or sterilized.

The filter was filled with well water to which one culture of Haffkine's 2nd cholera vaccine had been added.

	Vibrios.	No. of microbes. Per c. c.
Unfiltered water ...	+	30,000
Filtrate immediately ...	0	1,000
July 29th.—		
Unfiltered water ...	+	35,000
Filtrate No. 1 ...	0	300
Filtrate No. 2 an hour later ...	0	200
July 30th.—		
Unfiltered water ...	+	20,000
Filtrate No. 1 ...	+	440
Filtrate No. 2 ...	+	300

The filter became empty at 11 A.M. on 30th July. It was re-charged with ordinary well water, and the filtrate examined next day contained cholera vibrios.

This also was a worthless filter.

Experiments with the *Staphylococcus Pyogenes Aureus* which was found in the Jumna water at a time when boils were prevalent in Agra, viz., during June and July.

On June 30th a yellow colony was found on the surface of an agar tube received from the Municipal Engineer, Agra, and labelled 'Jumna water at Intake'; this microbe was isolated and examined under the microscope. It proved to be a coccus and formed golden yellow colonies on the surface of agar.

At this time my office chaprassi was suffering from boils. A boil on his leg was opened with a sterilized knife and the pus inoculated on the surface of agar. On the following day there was a pure culture of microbe which, on examination under the microscope, was found to be a coccus identical in morphological characters with the coccus found in the Jumna water at the Intake.

About 100 of a culture from each of these cocci was injected subcutaneously into the ears of two rabbits, one rabbit being inoculated with the coccus from the Jumna and the other with the coccus from the boil.

July 1st.—There was severe local inflammation of the ear in both rabbits, and there seemed to be a tendency to local necrosis of the tissues.

July 2nd.—Very severe local inflammation of the inoculated ear in each rabbit. Blood from the healthy ear of each rabbit was examined microscopically and found to be sterile.

This blood was inoculated on agar and the tubes placed in the incubator.

July 3rd.—The agar tubes were found to be sterile.

July 4th.—Severe inflammation together with local necrosis of tissue in the inoculated ear of each rabbit.

July 6th.—Inflammation subsiding.

July 15th.—Ears of both rabbits quite healed leaving oval holes $\frac{1}{2}$ " x $\frac{1}{4}$ ".

It may be that sufferers from boils contracted this affection by bathing in the Jumna. The weather was very hot, the people bathed a great deal and also suffered from prickly heat. The portions of the body affected with prickly heat would offer favourable points for inoculation with the micrococcus. The *Micrococcus Pyogenes Aureus* is very frequently found in 'Intake water' during the hot weather. The river water may have primarily contained the micrococcus, or, on the other hand, the micrococcus may have been inoculated into the river water by people suffering from boils, bathing and washing their clothes in the Jumna.

Experiments with sand filtration.

A water pipe 15 feet long and 1 inch in diameter was filled with Jumna sand up to 11 feet. The sand was previously sterilized by heating over Bunsen Burners and the pipe by heating over a fire. A piece of cloth was washed in perchloride of mercury solution and then in boiling tap water. The cloth was then tied over one end of the pipe. The pipe was then suspended from the roof and water poured into the open end. Filtered water began to flow at the lower end of the pipe after 2½ hours. In 6 hours about 3 litres of water had been filtered.

August 4th.—

	Miseroles	Per e. c.
(1) Unfiltered water	...	1,000
(2) Filtered water as soon as it appeared	...	8
(3) Filtered water an hour later	...	6
(4) Filtered water an hour later than (3)	...	16
August 5th, 11 A.M. Unfiltered water	...	120
Filtered water (1)	...	Imnumerable.
Filtered water (2)	...	Ditto
4 P. M.		
Unfiltered water	...	250
Filtered water (1)	...	Imnumerable.
Filtered water (2)	...	Ditto.

The experiment shows not only how completely the sand failed to prevent the passage of microbes through it, but how readily they flourished and reproduced in the sand.

Investigation of an outbreak of cholera at Sangor.

This outbreak was investigated by Mr. Hankin. An account of the outbreak and the investigations carried out in connection with it have already been published by Mr. Hankin in the *British Medical Journal* of December 26th, 1896, from which the following account is taken:—

On July 13th, 1896, thirteen persons sat down to dinner on a guest night at an Officers' Mess in Sangor. Two days later no fewer than nine of the partakers of the dinner were attacked with severe diarrhoea, vomiting, and prostration which in three cases developed into typical cholera. Of these three cases, only one recovered. The outbreak in its sanitary aspects was investigated by Brigade-Surgeon-Lieutenant-Colonel Hutcheson, Sanitary Commissioner to the Central Provinces, assisted by Surgeon-Captain Marks. At the time no other cases of cholera were occurring elsewhere in cantonments, and but little cholera was present in the neighbouring town. This isolation of the outbreak might be regarded as adding to the difficulty of supposing that it was ordinary cholera, and it might be suggested that it was an example of ptomaine poisoning. The high percentage of those exposed to the infection who were attacked, and the presence of tinned prawns in aspic as an item in the menu of the fatal dinner party lent colour to this idea. But, on the other hand, the existence of a regular incubation period of about two days in every case, the typical choleraic aspect of the symptoms in the severer cases, and the fact that at least two of those attacked had not eaten the tinned prawns, made the conclusion inevitable that the disorder was due in part at least to the cholera microbe.

(To be continued.)

Reviews and Notices of Books.

A HANDBOOK OF THE DISEASES OF THE EYE AND THEIR TREATMENT. BY HENRY R. SWANZY, A.M., M.B. Sixth Edition, 1897. H. K. Lewis: London, pp. 608, large post 8vo. 10s. 6d.

THIS well known text-book has achieved such a secure position that little criticism is necessary in noting its sixth edition. It is now printed on thinner paper than formerly with the result that the matter in it has increased, while the bulk has not. A few of the illustrations have also been omitted, and the coloured plates showing the course of the optic nerve fibres with the cortical centres and relations to fields of vision, illustrating the macular supply, have been replaced by a printed diagram.

The principal changes in this edition are the omission of a few pages on Elementary Optics, the expansion of Chapter XVII on Amblyopia, &c., due to central causes, with the introduction of an account of functional derangements of vision. The chapter on diseases of the orbit too has undergone some changes. Otherwise this edition has not much altered from its predecessors. Mr. Swanzy still practises the 3 m. m. flap operation for extraction of cataract with a small iridectomy and vehement in his argument against the 'simple'

operation. He has had only four iris prolapses with incarceration in 351 consecutive extractions as compared with 6 to 12 per cent of iris prolapses which he says the best statistics of operators by the simple method now show. Such figures must carry great weight.

In India where cataracts are frequently complicated by iritic adhesions and where the patients usually get up and walk about at once, it is probable that the 'combined' method will continue to be most largely performed, and to give the greatest percentage of successes. One great objection to the simple operation upon which however Mr. Swanzy lays less stress than it deserves, is the large number of secondary operations for laceration of capsule it entails—varying from 30 to 40 per cent! This objection is even of greater weight in India where it is all one can do to persuade the patient to remain in hospital a day after he has had the bandages opened, and has ascertained that he really can see at all.

DENTAL MATERIA MEDICA AND THERAPEUTICS.

BY JAMES STOCKEN, L.D.S., ENG., Revised by Leslie M. Stocken, L.R.C.P., M.R.C.S., L.D.S.; and J. O. Butcher, L.D.S., Eng.—Fourth Edition, Fcap. 8vo., pp. 155. Publisher: H. K. Lewis, 136, Gower Street, W. C., London. Price 4s.

THE first part of the book, treating generally of materia medica, pharmacology and therapeutics, has been almost entirely re-written and re-arranged, with the object of forming an introduction to the subject considered, particularly from a dental point of view.

The second part is said to contain a description of drugs, having special reference to dentistry, but we miss many drugs of value, e.g., B. naphthol, gallic acid, &c. The descriptions are meagre. Moreover, in a work on dental materia medica we are taught of things which we might have learnt better from some other source. We might quote the following example to illustrate our remark. In talking about salicylic acid, the editors say: "It has been largely used as an antipyretic in acute rheumatism, &c. It is also used in chronic rheumatism to relieve the swelling and pain of affected parts." Again, in speaking of ergot, it is said that "It is much used in the third and sometimes the second stage of labour, for its ecbolie properties." In page 85 we read that sulphate of magnesia is "a refrigerant and saline purgative. In dyspepsia, accompanied by costiveness, the sulphate of magnesia in small doses has been found very effectual."

There are quite a large number of drugs in general use in the practice of dental surgery, the descriptions of which are not included in the ordinary text-books on materia medica. This small work dealing with these special drugs is apparently intended to fill in this gap, but unfortunately it can hardly be said to have done so at all adequately.

A therapeutic index of diseases, drugs, prescription, &c., is given, and will be found very useful to the general practitioner.

Finally, a few pages are devoted to artificial respiration, classification of medicines, hints on prescription writing and a list of abbreviations met with in prescriptions.

DIPHTHERIA AND ANTITOXIN.

BY NESTOR TIRARD, M.D.

Longmans, Green and Co., 1897.

IN this little work Dr. Tirard gives us the results of his experience at the London Evelina Hospital for Sick Children. Admirable as the book is, we wish the author had devoted more space to the antitoxin, and less to the ordinary facts of diphtheria, which have been so often and so fully described by previous writers. As it is, the antitoxic serum treatment of diphtheria is relegated to the last chapter, which consists of little more than twenty pages; whereas nearly six times as much space is given to the causation and spread, symptoms, complications and sequelae, diagnosis and prognosis, general and medicinal treatment of diphtheria, and the treatment of laryngeal diphtheria by intubation or tracheotomy.

No account is given of the history of the evolution of the serum treatment, nor of the theory of its action, nor of the methods of its preparation, and bacteriological data are conspicuous by their absence. No comparison is made of the relative potency and dosage of the varieties of serum in common use, e.g., that of Behring or Aronson, of the British Institute of Preventive Medicine or of the Pasteur Institute, or of the dried scale preparations. Nothing is said about the preservation of the serum against vicissitudes of climate, nor of the length of time it may be reasonably expected to remain reliable. Then, again, from such an authority as the Senior Physician of the Evelina Hospital we might have hoped for some practical information concerning the prophylactic use of the antitoxic serum, about the duration of immunity after injection, and regarding the period after injection that a diphtheritic patient may be considered as no longer a focus

of infection for his family or neighbours. For instance, a patient suffering from diphtheria is brought to hospital, injection of serum is followed by rapid recovery, when may such a patient be safely allowed to mix with other people? How long after injection do his secretions constitute an element of danger to others? Does the serum treatment curtail the period of isolation?

A summary of the results in all cases treated at the Evelina Hospital with diphtheric antitoxin would have been of interest. Tables might have been given of the laryngeal and non-laryngeal cases, and of the recoveries, or mortality, in those cases which were injected on the 1st, 2nd, 3rd, &c., day of the disease.

Dr. Tirard's conclusions are stated with studied caution, and as the result of deliberate conviction. "I commenced," he says, "employing it (antidiphtheric serum) with a certain degree of adverse bias, due possibly to the recent failure of Koch's serum to justify the high expectations with which it was greeted; but as I witnessed the results obtained by antitoxic serum in diphtheria, I became more and more convinced of its efficacy, if employed sufficiently early. Whereas a few years ago a large number of cases of diphtheria, especially those affecting the larynx, or nasopharynx, were regarded as extremely hopeless, I now feel that the whole prognosis depends more on the time at which the case can be treated than upon the site attacked. Antitoxin has produced no ill-effects of any importance, while, in the opinion of numerous competent observers, it has been the means of saving life in many apparently hopeless cases. . . . In fact, I believe that by the early recognition of the disease, and by the use of antitoxin at an early stage, we shall in future be able to reduce very materially death-rate from diphtheria."

The author found that the pulse and temperature usually improved after the use of antitoxin. He never saw any ill-effects from the urticarial or erythematous rashes that occasionally follow the injection of serum, nor does he believe that albuminuria is rendered more frequent. The alleged increased frequency of albuminuria after the employment of antitoxin he explains by the larger number of survivors, and by the more careful and complete reports of cases. Albuminuria rarely causes any symptoms in diphtheria, and formerly it used either to be overlooked or regarded as a symptom of no great consequence. He does not believe that the serum treatment causes articular rheumatism, nor has he found that paralytic sequelae are more common after its use.

Dr. Tirard lays great stress on the pulse as an aid in the diagnosis of diphtheria. He emphasises its disproportionate rapidity as compared with the temperature, which is not usually high at the onset of the disease. Another point is, that the pulse is subject to great variations in force and regularity within the space of a few hours during the course of the illness. A markedly slow pulse, if it occurs without any improvement in the other symptoms, is often of fatal significance.

The author draws particular attention to the early abolition of the knee-jerk in diphtheria, and recommends that the patellar tendon reflex should be tested in every case. It is a most valuable aid in the differential diagnosis of a dubious case of diphtheria from one of ordinary tonsillitis, and other common throat affections.

The chapters on complications and sequelae, and on the treatment of laryngeal diphtheria, are specially good and contain much material of practical interest. In laryngeal diphtheria he insists on the importance of early tracheotomy or intubation, especially if the antitoxic serum can be injected simultaneously. If tracheotomy has to be done, he favours the use of chloroform in all cases, because of its tendency to allay spasm. Either, he thinks, should always be avoided. He is of opinion that the use of antitoxin has greatly widened the sphere of intubation, which may now be more freely resorted to before proceeding to the more formidable operation of tracheotomy.

send to head-quarters. The central hospital should, therefore, be above suspicion, and we are glad to see that at last the Government has ordered an enquiry into the working of this establishment. We are perfectly well acquainted with the nature of the complaints made and with the personality of many of those who now stand in the position of accusers, and we feel sure that we may make certain prophecies as regards the outcome of the enquiry now instituted. Taking the complaints as stated in the *Calcutta Gazette* of April 14th, we find that "it has been alleged that delay occurs in admitting patients who are brought to the hospital; that the Resident Surgeons are not always in attendance; that the medical and nursing staff are insufficient; that the food is bad and the cooking arrangements defective; that the supply of bed linen and clothing is unsuitable and inadequate; that the stock of instruments is out of date, and the fittings and arrangements of the operating room untidy and neglected; and finally that the Superintendent does not devote enough time to the work of the hospital. With regard to the personal questions involved we feel sure that the Superintendent and Resident Surgeons will be acquitted of any laxity. The Superintendent is one of the busiest officials in Calcutta and has many duties to perform outside his appointment at the Presidency General Hospital. He has a certain number of patients to visit in the hospital and a certain amount of office work to perform, and this done he depends, and in our opinion rightly, on the Resident Surgeons for the management of the rest of the establishment and for information as to details over which he exercises a general supervision. It seems hardly necessary to mention that, of the two Resident Surgeons, one is always on duty and within call, and seldom in the history of the hospital has any case of neglect been substantiated against these gentlemen. Complaints have been, we know, often made, but on sifting matters it has been found that some patient feels hurt because the Resident Surgeon has not welcomed him on the steps of the hospital like a hotel porter or has not taken quite such a serious view of a slight injury or ailment as the complainant. To the admitting officers too we think little blame will be finally attached. The admitting officer, who is often also the officer on duty, may be called suddenly to one of the wards when on duty, and if patients arrive during his absence the delay in admission is unavoidable. The only remedy for this condition of things lies in having a full staff of military assistant-surgeons, so that the duties of admitting officer and medical subordinate on duty need not be combined as has frequently been the case in past years. We have advisedly used the term 'military' assistant-surgeons because certain patients, object to being examined for assistant-surgeons. As regards the food we venture to believe that the Committee of Enquiry will find that the raw supplies are in the main good, and that the cooking arrangements are mainly responsible for the dissatisfaction felt by the patients. Instead of one central kitchen, each block should have its own separate kitchen and cooks. The beefsteak and soups would then be hot and fresh and the diets could be prepared with more attention to scientific cookery and to appearances. Cooked in a mass at a distance from the wards the food is often rejected on account of its uninviting appearance. A European dietary cannot be dealt with as if it was so much rice or dal. The rest of the complaints are easily removable if funds are forthcoming, and they are not new by many years. Money will provide better nurses, better instruments and a more complete outfit of linen, etc. One word in conclusion as to the operating theatre. This room is bad in every respect, and those who have visited the operating theatres of the Middlesex or St. Thomas' Hospitals can only be filled with awe at the absence of antiseptic arrangements and with wonder at the success attained by the staff under such conditions.

I. M. S.

Correspondence.

ADMINISTRATION OF THE PRESIDENCY GENERAL HOSPITAL.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—For some years there has been a feeling not only in Calcutta but throughout the whole of Bengal that the Presidency General Hospital did not fulfil the expectations of the European and Eurasian community for whose use it exists. It is very desirable that in Calcutta there should be a hospital of the highest class as regards outfit, nursing and medical staff to which a Government official or other European may be admitted when attacked by serious illness. It is no disparagement to the provincial civil surgeons to say that many of the cases which they have to treat cannot be satisfactorily dealt with in the home of the patient, and such cases they gladly

Appointments, Leave, &c.

INDIA.

The services of Surgeon-Captain G. S. T. . . . M.C.H., I.M.S. (Bombay), are placed . . . disposal of the Government of Bomb . . . on plague duty, with effect from the 17th January 1897. The services of Surgeon-Captain W. E. Hardy, A.M.S., are placed temporarily at the disposal of the Foreign Department for plague duty, with effect from the 11th March 1897. Colonel Alfred Henry Williams, M.B., Bengal Establishment, 9th Gurkha Bengal Infantry, has been permitted by the Secretary of State for India to retire from the services with effect from the 4th July 1897, subject to Her Majesty's approval.

The services of Surgeon-Captain W. P. Barter, A.M.S., are placed temporarily at the disposal of the Government of the North-Western Provinces and Oudh for employment on plague duty, with effect from the date on which he assumed charge of his duties.

The services of Surgeon-Captain W. Westropp White, M.D., M.C.H., I.M.S. (Bengal), are placed temporarily at the disposal of the Government of the North-Western Provinces and Oudh for employment on famine duty, with effect from the date on which he assumed charge of his duties.

The services of Surgeon-Captain H. D. Mason, A.M.S., are placed temporarily at the disposal of the Government of Bombay for employment on plague duty, with effect from the date on which he assumed charge of his duties.

The services of the undermentioned officers are placed temporarily at the disposal of the Government of Bombay for employment on plague duty, with effect from the dates on which they assumed charge of their duties:—

Surgeon-Lieutenant P. Evans, M.B., A.M.S.

Surgeon-Lieutenant A. E. Milner, A.M.S.

The services of Surgeon-Lieutenant-Colonel J. S. Wilkins, D.S.O., I.M.S. (Bombay), are placed temporarily at the disposal of the Government of Bombay for employment on plague duty, with effect from the 27th April 1897.

The services of Surgeon-Captain W. P. Barter, A.M.S., are placed temporarily at the disposal of the Government of the North-Western Provinces and Oudh for employment on plague duty, with effect from the date on which he assumed charge of his duties.

The services of Surgeon-Captain W. Westropp White, M.D., M.C.H., I.M.S. (Bengal), are placed temporarily at the disposal of the Government of the North-Western Provinces and Oudh for employment on famine duty, with effect from the date on which he assumed charge of his duties.

The services of Surgeon-Captain F. M. Mangan, A.M.S., are placed temporarily at the disposal of the Government of the Punjab for employment on plague duty, with effect from the 3rd April 1897.

NORTH WEST PROVINCES AND OUDH.

The undermentioned officers, whose services have been placed at the disposal of this Government, are posted as noted below with effect from the dates specified against their names:—

Surgeon-Captain W. P. Barter, A.M.S., Plague duty, Shaharapur, 3rd May 1897.

Surgeon-Captain W. Westropp White, M.D., M.C.H., I.M.S., Plague duty, Jhansi, 9th May 1897.

Military Assistant Surgeon O. A. Farmer, Plague duty, Jhansi, 21st April 1897.

Assistant Surgeon Jyotish Chandra Pal, Reserve duty, Lucknow, 16th April 1897.

Assistant Surgeon Rajendra Lal Chakravarti, Famine duty, Jhansi and Lalitpur, 16th April 1897.

Assistant Surgeon Dandendra Singh Otto, Reserve duty, Lucknow, 6th May 1897.

BOMBAY.

Brigade Surgeon Lieutenant-Colonel J. Arnott, M.B., C.M., (Glas.), is allowed furlough to Europe on medical certificate for one year under the furlough rules of 1883.

With reference to Government Notification No. 1799—1251-copy, dated 1st April 1897, and Government Notification (Revenue Department) No. 3337, dated 3rd instant, Mr. J. M. Campbell, M.A., LL.D., C.I.E., I.C.S., should, on taking over charge of the office of Acting Commissioner of Customs, Salt, Opium and Abkari, continue to perform the duties in connection with the valuation of buildings referred to in the Notification of the 1st April 1897 quoted above.

Surgeon-Major J. C. H. Peacock, Civil Surgeon, Karwar, is allowed furlough on medical certificate for six months.

His Excellency the Governor in Council is pleased to make the following appointments:—

Surgeon-Lieutenant-Colonel H. W. B. Boyd, F.R.C.S.I., to act as Physician, St. George's Hospital, Bombay, in addition to his own duties, during the absence of Brigade-Surgeon Lieutenant-Colonel J. Arnott, M.D., C.M. (Glas.), or pending further orders.

Surgeon-Major D. C. Davidson to act as Surgeon, Gokaldas Tejpal Native General Hospital, Bombay, during the absence of Surgeon-Lieutenant-Colonel D. N. Parakh or pending further orders.

Surgeon-Lieutenant-Colonel W. K. Hatch, M.B., C.M., F.R.C.S., is allowed privilege leave of absence for two months.

Surgeon-Major H. Martin, M.B., Surgeon to His Excellency to the Governor, is allowed leave out of India on private affairs for eight months under Article 704, Army Regulations, India, Volume I, Part I.

BENGAL.

The following Civil Hospital Assistants passed the English and Septennial Professional Examination of Medical Subordinates held on the 19th April 1897:—

Names of candidates who have passed the English Qualification Examination for higher pay held on the 19th of April 1897.

Grade.	Name.	Attached to	REMARKS.
1	2	3	4
2nd ..	Ananda Charan Sirkar ..	Bhowanipore Hospital.	
2nd ..	Kali Charan Mandal ..	Officiating Senior Demonstrator of Anatomy, Dacca Medical School.	
3rd ..	Gobind Chandra Misser ..	Special duty, Murshidabad.	
3rd ..	Bhubun Mohun Misser ..	Banki Dispensary, Cuttack.	
3rd ..	Judhisteer Nath ..	Chemical Assistant, Medical School, Dacca.	
3rd ..	Syed Altaf Hossain ..	Duty, Opium Weighments Champaran.	
3rd ..	Syed Izharuddin Ahmed	Ditto Ditto.	

Miss Ida Browne is appointed to be an Inspecting Officer for the purposes of carrying out the provisions of the Epidemic Diseases Act, 1897, at Khana Junction on the East Indian Railway.

Assistant Surgeon Purna Chandra Parkait, of the Mymensingh Charitable dispensary, held medical charge of the civil station of Mymensingh, in addition to his own duties, from the forenoon of the 1st to the afternoon of the 8th April 1897.

Babu B. P. Mozumdar made over charge of the Chittagong Jail to Surgeon Major F. J. Drury on the forenoon of the 3rd April 1897.

Surgeon-Lieutenant-Colonel S. Borah, M.B., Civil Surgeon, Sibsagar, is transferred to the Cachar district.

The Lieutenant-General Commanding the Forces is pleased to make the following appointment:—

Surgeon-Captain L. Rogers, M.B., to the officiating medical charge of the Regiment.

The undermentioned officer is granted leave out of India:— Surgeon-Captain E. C. Anderson, for six months on private affairs. The leave to reckon from the date of termination of duty with troops proceeding to England.

The undermentioned Medical Warrant Officer is granted leave in India:—

3rd class Assistant Surgeon R. T. H. Hardaker, from 15th May 1896 to 2nd July 1896, on private affairs, under the Furlough Rules of 1889.

The undermentioned officer is granted leave out of India:— Surgeon Major P. J. Dempsey, for six months, on medical certificate.

Acknowledgments.

JOURNALS RECEIVED.

Lancet—British Medical Journal—The Practitioner—Edinburgh Medical Journal—American Journal of Obstetrics—Dublin Journal of Medical Science—Archives of Gynecology and Obstetrics—Manual of Gynecology and Padiatry—Therapeutic Gazette—Provincial Medical Journal—The Journal of the American Medical Association—New York Medical Journal—Medical Record, New York—Boston Medical and Surgical Journal—Times and Register, Philadelphia—Abstract of Sanitary Reports, United States—Occidental Medical Times—Merek's Bulletin of Advanced Medicine and Surgery—Medical and Surgical Reporter—The American Journal of the Medical Sciences—Medical Chronicle—Times and Register—Sanitary Record—Medical Press and Circular—La Tribune Medico—La Reforma Medica—Gazette Hebdomadaire—South Russian Medical Gazette—Archives Cliniques du Bordeaux—Gesundheitsamt—Montreal Medical Journal—Dietetic and Hygienic Gazette—Toledo Medical Compound—The Bristol Medical-Chirurgical Journal—Pacific Medical Record—Lo Morcredi Medical—Annales de La Policlinique De Lille—United Service Gazette—Indian Medical Record—Indian Correspondence—Indian Medical Medico da India, Goa.

BOOKS AND PAMPHLETS RECEIVED.

Disorders of Digestion in Infancy and Childhood. By W. Soltan Fenwick, M.D., B.S., London.

Aphasia and Cerebral Speech Mechanism. By William Elder, M.D., F.R.C.P.

The Medical Practitioner's Pocket Reference. By W. J. Farr.

COMMUNICATIONS RECEIVED.

Prof. Haffkine, Bombay.—Surgn.-Capt. Lenmann, Bombay.—Surg.-Capt. Vost, Gonda.—Surgn.-Capt. Pridmore, Bhamo.—Surgn.-Maj. Fink, Assam.—Surgn.-Maj. W. J. Buchanan, Bhagalporo.—Surgn.-Capt. D. M. Moir, Calcutta.—Surgn.-Capt. R. H. Elliott, Madras.—Surgn.-Maj. D. G. Crawford, Monghyr.—Surgn.-Capt. C. Duer, Rangoon.—Dr. Kedarnath Das, Calcutta.—Brig.-Surgn.-Lieut.-Col. McLeod, London.

Original Communications.

THE INFILTRATION (SCHLEICH) METHOD FOR PRODUCING LOCAL ANÆSTHESIA.

BY H. V. WURDEMAN, M.D. (UNIV. COLUMBIÆ), MILWAUKEE, WIS., U. S. A.

(Director and Secretary, Wisconsin General Hospital Association; Oculist and Aurist to the Children's Hospital and to the Milwaukee County Hospital for the Chronic Insane; Secretary, Section on Ophthalmology, American Medical Association, 1895.)

THE value of infiltration anæsthesia has been proven beyond doubt, and its applicability for many surgical procedures has been acknowledged in America and Germany; but perusal of the European literature at my command does not note any acceptance as yet among English surgeons.

In 1891¹ Schleich of Berlin published a report of some experiments made for the purpose of producing local anæsthesia which was followed later by other papers^{2, 3}, and in August 1894 his full conclusions and reports of more than three thousand operations, varying in severity from ovariectomy and capital amputations to minor procedures, were published in his monograph.⁴ This was presented at the German Congress of Surgeons in July 1894 and brought to my notice in August of that year. I began following his line of experiments with some diffidence, but since the introduction of the method to America in November 1894⁵⁻¹² I have had a wide and satisfactory experience.⁹⁻¹⁶

Schleich was employed in research for the production of a better and less harmful method of local anæsthesia than that which had hitherto obtained. He first experimented with hypodermatic injections of cocain and other drugs, finding that a two per centum solution of cocain* was the weakest which would produce anæsthesia when introduced beneath the skin. A couple of syringefuls of this solution would be the toxic dose, and such an amount would be necessary in many trivial operations. It is well known that cocain injection is dangerous to life, and even small quantities of the drug may give rise to very unpleasant symptoms.

Our investigator discovered that by injecting the solution *into but not under the skin* in the surprisingly small quantity of 0.002 to 0.10 (two to a thousand), a practical anæsthesia would result throughout the whole thickness of the skin, and insensibility more profound than that by hypodermatic injection of a solution one hundred times this strength could be obtained. The logical deduction followed that the drug itself could not be the main agent in causing the anæ-

thesia. Injections of distilled water were tried and produced anæsthesia, but these were painful, i.e., the infiltration of the water into the skin (or tissues) produced a burning pain which transcended that of the knife. Complete anæsthesia, however, followed the infiltration.

Could it be the infiltration alone that produced the pain of injection and later obtunded the sensibility? Injections of the normal salt solution (0.6 per cent.) were made, but no anæsthesia followed, yet the injection itself was painless. The proposition to be solved then was as follows:—If infiltration of water alone into the tissues produced pain followed by complete anæsthesia, while the injection of 0.6 per cent. sodium chlorid was painless, but made no alteration in the sensibility of the nerve ends, there must be between these two extremes a salt solution of certain strength which would at the same time be so similar to the normal fluid of the blood as to cause little or no pain in infiltration and yet be sufficiently like water to produce anæsthesia of the parts so injected. Experiments proved that a 0.2 per cent. salt solution met these requirements. Solutions above or below these strengths were either painful to inject or produced no anæsthesia. Operations may be painlessly done by a 0.2 per cent. salt solution. I have personally experimented with various fluids.¹⁰ The ethers and alcohols are similar to water in that they cause burning pain on injection, followed later by anæsthesia. Ether, however, produces capillary hæmorrhage, and alcohols coagulates the albumin of the tissues, and both substances, aside from this, are too irritative to be of use in this method. The various oils are not painful to inject, but afford no anæsthesia. They are usually absorbed without producing material change in the tissues.

Cocain 0.2 per cent., morphin 0.2 per cent., accarbol 0.2 per cent., bromide of potassium 3.0 per cent., methyl violet 1.0 per cent., caffein 2.0 per cent., sugar 3.0 per cent., and other substances in aqueous solution were found to allow of the anæsthetic action of water upon the nerve filaments. The anæsthetic drugs, cocain, accarbol, and morphin have a special characteristic, i.e., their addition in very small quantities to the 0.2 per cent. salt solution prevented the paræsthesia incident to injection of simple saline solution and the infiltration of inflamed or hyperæsthetic areas could be made without pain.

The narcotics were more active when used in the 0.2 per cent. salt solution, and could be used in even lower attenuations, for instance, 0.01 per cent. cocain in a 0.2 per cent. salt solution prevented paræsthesia. It was also found that if the solutions were used *cold* their efficacy was increased many fold, and that when used at the temperature of the body, little or no anæsthesia followed.

* Ten per cent. solutions have been commonly used for hypodermatic injection.

The following formulas are advocated by Schleich :—

R.	Cocain mur.	...	20	gr.	iii.
	Morph. mur.	...	035	gr.	$\frac{1}{4}$
	Natr. Chlor.	...	20	gr.	iii.
	Aqu. Dest. ad.	100	$\frac{1}{3}$		iii.
M.	Sterilisat. adde. sol. ac. carbol. 5 per cent.	gtt.	ij.		
S.	Solution No. 1, <i>Strong</i> .—For operations upon highly inflamed or hyperæsthetic tissues.				
R.	Cocain mur.	...	10	gr.	iss.
	Morph. mur.	...	025	gr.	$\frac{1}{4}$
	Natr. Chlor.	...	20	gr.	iii.
	Aqu. Dest. ad.	100	$\frac{1}{3}$		iii.
M.	Sterilisat. adde. ac. carol. 5 per cent.	gtt.	ij.		
S.	Solution No. 2, <i>Normal</i> . For most operations.				
R.	Cocain mur.	...	01	gr.	$\frac{1}{4}$
	Morph. mur.	...	005	gr.	$\frac{1}{8}$
	Natr. Chlor.	...	20	gr.	iii.
	Aqu. Dest. ad.	100	$\frac{1}{3}$		iii.
M.	Sterilisat. adde. sol. ac. carbol. 5 per cent.	gtt.	ij.		
S.	Solution No. 3, <i>Weak</i> .—For superficial operations upon nearly normal tissues.				

Parke, Davis and Co., of Detroit, Mich., Wyeth and Bro., of Philadelphia and Kohlmeier of Berlin (the latter through Schleich), have prepared tablet triturates and compressed tablets from which these solutions may be extemporaneously made.*

The necessity for asepsis is even more important than in surgical procedure, where a general anæsthetic is used. 4-11 The technique of endermatic infiltration is more difficult than that of hypodermatic injection. Strict sterilization of all instruments, particularly of the syringe and needles, and absolute cleanliness of the hands and field of operation, is required. All solutions should be boiled and cooled before each operation in order to avoid the slightest possibility of sepsis. Although we see but little of hypodermatic abscess, despite the notorious carelessness with which the hypodermic syringe is commonly used, being passed from one patient to another without sterilization, and in many cases without care as to the source of the water used for injection, sepsis must sometimes occur. If the tissues be infiltrated, phagocytosis is in abeyance, for here the juices of the tissues are replaced by the injecting fluid which remains in contact with the intercellular elements for the space of fifteen minutes to an hour, i.e., until the circulation of the part be fully restored. Thus, septic germs could find lodgement and make great headway before the re-establishment of the equilibrium. In ordinary hypodermatic injections a depot is made under the skin and the fluid rapidly absorbed. Hence extreme carefulness is essential even in trivial operations. The solutions are not injured by heat, but should be used cold before each operation. The bottles containing the anæsthetic fluids should be laid on a block of ice or otherwise cooled.

The discovery of these truths, so valuable for the question of local anæsthesia, is due simply to

a slight change of method; the application of the solution within and not under the skin."

The anæsthesia is caused by the replacement of the normal fluids of the tissues by a fluid of less specific gravity (the water), which causes anæmia, compression and cooling, producing thereby a temporary paralysis of the nerve filaments. The pain of infiltration of indifferent solutions is abolished by the minute doses of narcotic drugs, (morph., cocain, carb., ac.).

It is perhaps well to here go into the technique of the production of local anæsthesia by this method. The field of operation is made aseptic in the usual manner; having the required formula, the solution aseptic and cold, we fill the sterilized hypodermic syringe; pinching the skin slightly between the thumb and forefinger of the left hand, the needle is then passed obliquely under the epidermis to the papillæ, intra-cutaneously, until the lumen is fully inserted. A few drops are then injected, thereby producing a white elevated wheal, the infiltration extending throughout the whole thickness of the skin. There is immediate and complete anæsthesia throughout the extent of the infiltration *which lasts from ten to twenty minutes* according to the density of the tissue so cedematized. The needle is then reinserted at the periphery of the wheal, and the area infiltrated to the required extent and depth. "No tissue offers any deviation from the dictum; every structure is made anæsthetic that can be artificially cedematized; this holds good for skin, mucous, and synovial membrane, periosteum, fascia, muscle, lymph glands, nerves, viscera, and even bone."

Anæsthesia exists only within the area infiltrated by the solution, and outside of that normal sensation remains. In operations on or through the skin and mucous membranes, the first wheal is increased to the size of a dime by increased pressure on the piston; the needle is moved and reinserted at the periphery of the wheal, but still within it, and a new wheal is raised. In this way the line of incision is marked out to any desired length or breadth. In general surgical operations we would then infiltrate the underlying tissues, by slowly pushing in the needle and injecting a few drops at a time until the deeper tissue is cedematized.

By cooling the spot selected for the formation of the first wheal by ether or rhigolene spray, or on mucous membranes by touching the spot with a strong solution of carbolic acid or applying cocain, the first injection may be made, if so desired, without even feeling the prick of the needle. I seldom have recourse to this procedure,

* These tablets contain no carbolic acid. If solutions are to be kept some time, it is advantageous to add a couple of drops of a 5% solution of carbolic acid after mixing.

* The infiltration may be made by any hypodermic syringe, using preferably a needle of small calibre. Bransford Lewis of St. Louis, U. S. A., has devised a syringe with small sharp needles for infiltrating skin and periosteum, etc., and with blunt needles for infiltrating soft tissues in neighbourhood of large arteries.

as a very fine needle may be inserted without pain, even in very tender tissues, such as the eyelids. The succeeding injections may now be made without causing sensation. There is no sensation to the infiltration proper.

Where the tissues are inflamed the sensibility is pathologically increased. Here it is indispensable that the infiltration be begun in sound tissue and carried over into the part to be operated upon. The dilated blood and lymph channels of the inflamed skin allow us to anesthetize quite a large spot from one puncture.

The injection should be done slowly at first, and, when the infiltration is only felt by its tension, we may rapidly flood the part to the required extent. Under no circumstances must fluid be primarily injected into an abscess, an exudation or a pathologic focus. The only result is increased tension and pain. We cut off the inflamed part first by anesthetizing the surrounding normal tissue, and afterwards inject the inflamed area.

We must not lose sight of the cardinal fact that the anæsthesia exists only within the area infiltrated by these solutions, and that outside of that there is normal sensation. The method rests principally on the production of a complete artificial cedema of the tissues. Wherever we wish to operate with exact anæsthesia the field of operation must be tensely filled with the solution so that it exudes from the cut surface.

I need not call to your attention the well-known dangers of chloroform and ether anæsthesia, the waste of the surgeon's time, the discomfort to the patient, and the necessity for skilled assistance. Cocain injection of the solutions of the usual strength (5 to 10 per cent.) is certainly far more dangerous to life than the administration of chloroform. The higher solutions of cocain surely diminish the exudative process and retard the healing, and, in some cases, actually destroy the trophic filaments so that gangrene has been known to occur. Nothing of the sort has been found to result from the infiltration of the solutions recommended in this article. Anæsthesia is complete,

occurs immediately and lasts long enough for almost any external operation. There is no objection at any time to repeating the injection if feeling should return during the operation. Indeed, we might safely operate for hours upon a small area if so inclined; for instance, in solving after removal of tumours. The advantages of the method are also evident from its simplicity, safeness and celerity. It should be remembered that our use of attenuated solutions of the narcotic drugs has nothing akin to the doctrine of the followers of the dogma "*similia similibus*," etc. These statements may be readily substantiated upon your own persons, as I have done many times on myself and other physicians.

This method of anæsthesia is now in use by many surgeons and practitioners in the United States and Germany. Thousands of operations have been done, from the removal of ovarian tumours and capital amputations down to minor operations, without pain and with satisfaction to both patient and physician. My personal experience embraces more than a hundred operations mainly of minor character, owing to the nature of my practice. I have officiated at a number of general operations, making the injections myself. I have personally demonstrated this method by operating before the Milwaukee Medical Society,⁽¹²⁾ North-Western Wisconsin Medical Society,⁽¹⁴⁾ Section on Ophthalmology of the American Medical Association at the United States Revenue Marine Hospital in Chicago, in my own clinics and office and by request in other hospitals and in the offices of a number of my *confrères*. Where the infiltration has been properly made the results are always good, both as regards perfect anæsthesia and healing. Infiltration anæsthesia should replace the freezing methods and the injection of dangerous solutions of cocain entirely, and may be used for all operations of the skin and superficial structures in which chloroform or ether are commonly given. Certainly all operations of a minor character can be done with the aid of this method, and, judging

Schleich A.

(1) Verhandlungen der Berliner Medicinischen Gesellschaft, 1891

(2) Verhandlungen der Deutschen Gesellschaft für Chirurgie, 1892.

(3) Berliner Klinische Wochenschrift, 1892.

(4) Schmellose Operationen, Monograph, Berlin, 1894. Lewis, Brunsford.

(5) The Infiltration Method of Local Anæsthesia in Genito-Urinary Surgery, Tri-State Medical Journal, July, 1895.

(6) "An Improved Syringe for Infiltration Anæsthesia," Medical Record, December 7th, 1895. Perin, Theophilus

(7) "Schleich's Method of Local Anæsthesia," Phila. County Medical Society, December, 1895. Van Hook, W.

(8) "The Value of Infiltration Anæsthesia," Medical News, November, 1895. Hürdemann, H. W.

(9) "Explanation and Demonstration of the Infiltration

(Schleich) Method of Anæsthesia," Journal American Medical Association, December 29th, 1894.

(10) "The Infiltration Method of Anæsthesia in Ophthalmic Practice," Journal American Medical Association, November 16th, 1895.

(11) Notes on the Danger of Sepsis in Endermatic Injection (Infiltration Anæsthesia), Jno. Wyeth & Brothers, Phila. Press, 1896.

(12) Demonstration of Infiltration Anæsthesia before Milwaukee Medical Society, Milwaukee, Wis., November 27th, 1894.

(13) Demonstration of Infiltration Anæsthesia at the United States Revenue Marine Hospital, Chicago, Ill., December 2nd, 1894.

(14) Demonstration of Infiltration Anæsthesia before the North-Western Medical Society at Stevens Point, Wis., April 10th, 1895.

(15) Demonstration of Infiltration Anæsthesia before the Section on Ophthalmology, American Medical Association at Baltimore, Md., May 9th, 1895.

(16) Editorial Medical News, February 8th, 1896.

from recent literature upon the subject and personal reports from many surgeons throughout the United States of America, the method is gaining in popularity and will shortly replace general anaesthesia for minor operations except where infiltration is impossible or in the case of capital operations.

NOTES ON STONE IN THE BLADDER.

By BRIG.-SURGN.-LIEUT.-COL. D. F. KEEGAN, F.R.C.S.

I.M.S. (Retired.)

(Continued from page 130.)

MR. JONATHAN HUTCHINSON, in his address on Surgery at the annual meeting of the British Medical Association held in London in 1895, did me the honour of citing me as an example of personal specialism in crushing stones in children. Some eight or ten years ago, before the operation of litholapaxy in boys had been placed on a firm and lasting basis in India, and when I was combating theoretical objections to its extension to children, and before others had followed my example as they have done of late years, it is possible that I may have been more expert at crushing stones in children than some of my fellow workers in India. But I am happy to think that I cannot now lay claim to any such distinction, for there are scores of surgeons in India at the present day who can crush a stone in a child's bladder as well, if not better, than I can. To give the reader some idea of the popularity of litholapaxy in boys I may mention that in the year 1895, in the Multan district alone, 69 boys were treated for stone in the bladder. In 64 of these cases litholapaxy was successfully performed, and the 5 remaining were treated by lateral lithotomy. Surgeons in India are not, and never have been, enamoured of suprapubic lithotomy in its application to small uncomplicated stones in young males, and they have steadily refused to follow in the footsteps of their brethren in this country and in Europe generally.

The history of the revival of suprapubic lithotomy in England is in some of its aspects a curious one. Submitted to the favourable consideration of British surgeons by its distinguished advocate, Sir Henry Thompson, as the best method of dealing with very large stones in adult males and youths, it was suddenly seized upon by a number of inexperienced lithotomists, as the safest method in their hands, of dealing with small stones occurring in male children, and the good old lateral lithotomy which had stood the test of time and had proved so successful in boys, had to give way to its fashionable rival. But the pendulum has swung back, and Cheselden's operation will regain the position it should never have lost in the treatment of stone in young males. But brilliant and successful as lateral lithotomy has proved itself in dealing

with the great majority of calculi which the surgeon meets with in young males, it must not be forgotten that in three very important respects it is an inferior operation to a well-performed litholapaxy. The cure is more rapid, and the percentage of success is greater, in litholapaxy than in lateral lithotomy, and litholapaxy can claim the additional advantage that it is an operation in which the knife is not used. Any surgeon who in the present day is compelled to cut a young boy for a small, uncomplicated stone is, in my opinion, not to be envied; for with the good example set him by surgeons in India he cannot but feel that either through the lack of suitable instruments or by his own inability to use them with precision and safety, his young patient is being deprived of the benefits of a very distinct advance in surgery. He cannot but be aware that such a stone would be best extracted by a successful litholapaxy, and still from want of practical familiarity with the use of the lithotrite he hesitates to crush the stone and consigns his little patient to the dangerous ordeal of the knife. Mr. Reginald Harrison, in the "Twentieth Century Practice of Medicine," vol. i, in discussing the relative advantages of lateral lithotomy and litholapaxy in male children, comes to the rescue of such surgeons and gives them some crumbs of comfort in the following remarks: "Many practitioners who are expert lithotomists would fail to find the same success in their application of the crushing operation to male children. Some instances have been recorded where the bladder was ruptured in performing lithotrity, and it is probable that we should have further examples of this if the practice were much extended." True, deplorable accidents have occurred in the course of a litholapaxy in boys, but the number of such has not been very great. As well might one discountenance the operation of lateral lithotomy by enumerating the occasions on which some very distinguished surgeons have missed the route to the bladder in its performance. The fact of the matter is that hitherto, in discussing the relative advantages of lateral lithotomy and litholapaxy in male children, the subject has been viewed too often from the surgeon's standpoint when by rights it should be considered from the standpoint of the little patient and his friends and relatives.

The best operation for a boy, say, of seven or eight years, with an urethra of normal calibre suffering from the presence of a small uncomplicated stone is unquestionably litholapaxy. Such being the case, the question arises: Is a surgeon justified in cutting such a boy because he happens either not to have the necessary instruments for performing litholapaxy or, having them, does not know how to use them? I unhesitatingly answer, No, if by any possibility such a patient can be transferred to the care of one skilled in performing litholapaxy. The crushing of a stone

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in a boy's bladder is not an operation which every general surgeon in this country is expected to be able to perform. It is an operation for those who have enjoyed unusual opportunities of perfecting themselves in the use of the lithotrite, and it is not on all fours with operations of emergency, such as tracheotomy, the arrest of hæmorrhage, an amputation, or an operation for strangulated hernia. No surgeon who has been deprived of opportunities of learning the practical use of the lithotrite need be ashamed to confess that he feels himself unequal to performing litholapaxy on a young boy. The extension of litholapaxy to cases of stone in boys has reduced the mortality following stone operations among this class of patients in India by more than 50 per cent. to what it was ten or twelve years ago. This is a fact, and a very important one, and one, moreover, which cannot be any longer ignored. It would, therefore, be well if surgeons in all civilised countries were to carefully note the very important work which is being done at the present day in India in the surgery of stone in the bladder, and it would also be well if they would shape their practice in accordance with the methods which obtain in this unrivalled field for experience in this special branch of surgery.

III.—COMPARATIVE SAFETY OF LITHOLAPAXY, LATERAL LITHOTOMY, AND SUPRA-PUBIC LITHOTOMY IN PATIENTS AT ALL AGES.

TABLE III.—*Showing the number and result of Litholapaxies, Lateral Lithotomies, and Supra-pubic Lithotomies performed on patients at all ages in the Punjab, North-west Provinces, and Oudh, and in the Bombay Presidency during five years ending December 31st, 1895.*

Nature of operation.	Number of operations.	Cured.	Died.	Percentage of mortality.
Litholapaxy	10,073	9,665	399	3.96
Lateral Lithotomy ...	7,201	6,407	791	11.02
Supra-pubic Lithotomy	147	86	61	42.17

This table has been compiled from data supplied by the official medical reports published in India, and I have again counted the results of all operations tabulated in the "discharged otherwise" column as deaths. It is somewhat unfortunate that in the official returns of operations for stone performed throughout India the ages of patients are not classified in quinquennial and decennial periods, for if this were done the value of such returns would be much enhanced. The age of the patient and the weight of the calculus are two such very important factors in determining the results of litholapaxy,

lateral lithotomy, and supra-pubic lithotomy, that when we are not in possession of such factors it is almost impossible to gauge the relative mortality of these three operations. In lateral lithotomy, especially, the age of the patient and the weight of stone removed are most important factors in the solution of this problem. It would, therefore, be well if the ages of patients under fifteen years who undergo operations for stone in the bladder were classified in triennial or, at least, in quinquennial periods, and if the ages of patients between fifteen years and very advanced life were arranged in decennial periods. This is a matter which might profitably engage the attention of administrative medical officers in those provinces of India wherein stone in the bladder is prevalent. The table appended, although unfortunately it does not show the average ages of patients or the average weight of stone removed, is, in some respects, a valuable one and tells its own tale. A glance at it shows that litholapaxy is being practised largely throughout India, and that it is gradually superseding the time-honoured lateral lithotomy. A further examination of this table shows that the percentage of mortality following litholapaxy was only 3.96 as compared with 11.02 following lateral lithotomy. In the absence of all reliable information regarding the relative ages of patients submitted to operation, and the weights of calculi removed by these two surgical procedures, it would not be fair to institute comparisons regarding the mortality which followed them. But I think that there can be little doubt that the average weight of calculi removed by lateral lithotomy was greater than that extracted by litholapaxy, and that at the same time there was no great difference in the ages of the patients treated by these two methods. It is certainly a subject of congratulation that the percentage of mortality which followed litholapaxy was but 3.96 in a total of 10,073 patients submitted to this operation—a mortality which uncontestedly proves that there are at the present day a large number of skilled litholapaxists in India. Continuing our examination of the table we find that in a grand total of 17,421 operations for stone in the bladder supra-pubic lithotomy was performed only 147 times, and that the rate of mortality which followed it was 42.17 per cent. This rate of mortality is no doubt high, but not so high as it is in England and throughout Europe, when supra-pubic lithotomy is performed for very large calculi. It is true that the official reports published in India give no information regarding the average weights of calculi removed or the average ages of patients submitted to supra-pubic lithotomy; but knowing how unpopular this operation is among surgeons in India, I feel pretty certain that the average weights of the calculi in these 147 operations must have been very consider-

able. Judging from the information contained in Table II, it is but only reasonable to infer that the great majority of these 147 operations were performed on adult males, because Table II showed that in the Punjab during the year 1895 there were but two supra-pubic lithotomies performed on boys, and we may reasonably take the practice in the Punjab in 1895 as an indication of the methods which prevailed in other parts of India during the five years under review.

In recent years the trend of surgical opinion in India has been in the direction of restricting supra-pubic lithotomy to very narrow limits. Expert litholapaxists in India nowadays attack a stone weighing between two and four ounces with the utmost confidence, and are therefore seldom obliged to fall back upon supra-pubic lithotomy, and when they do meet with a stone which defies the power of a No. 16 or a No. 18 lithotrite they are more inclined to perform a lateral lithotomy or a perineal lithotomy than a supra-pubic lithotomy. I feel certain that in India perineal lithotomy will within the next decade occupy the place now held by lateral lithotomy in dealing with very large or hard calculi in adult males which resist the power of the largest lithotrites which can be safely introduced into the bladder per urethram. And should this opinion prove true, the death-rate of a very important class of cases will be greatly diminished. In the North-West Provinces and Oudh there were twenty perineal lithotrites performed during the year 1895 without a death; but, as no information is forthcoming regarding the average weight of calculi removed or of the ages of patients treated, I can only conjecture that these operations were undertaken for the removal of very large calculi from the adult male bladder. Some six months ago I had an opportunity of examining a very powerful lithotrite constructed by Messrs. Weiss and Sons for a surgeon living in a district of the Punjab where very large calculi are frequently met with. This lithotrite was of the fully fenestrated pattern; the stem corresponded to No. 20 (English scale), and at the angle it measured No. 26 (English scale); the length of the blades was $7\frac{1}{2}$ in., or shorter than an ordinary No. 16 lithotrite by about 3 in. It was constructed with a view of crushing large calculi which could not be dealt with by litholapaxy, and I am informed that it answers its purpose admirably. No doubt we shall hear more details regarding the capacity of this giant lithotrite from the surgeon who is so fortunate as to have many opportunities of using it, and full particulars regarding the cases in which it has been used. Such a lithotrite introduced through a small incision in the prostate would readily break up a mulberry calculus weighing between four and six ounces—indeed, few calculi could resist its crushing power. The success achieved by Mr. Reginald Harrison, and more recently by Mr. Herbert

Milton, in perineal lithotomy will, no doubt, stimulate surgeons in India to adopt this method in preference to lateral lithotomy. We know how the death-rate following lateral lithotomy increases in direct ratio with the size of the stone to be removed, and that this is especially true when we have to deal with patients at the middle period of life. This mortality is in a great measure due to the large incision made in the prostate, which sometimes unfortunately encroaches on the capsule of the gland, and to the almost inevitable bruising of the neck of the bladder and of the tissues of the perineum in the extraction of a large, unbroken calculus by this route. It was with the intention of counteracting these risks that supra-pubic lithotomy was revived; but experience has taught us that supra-pubic lithotomy is not more successful than lateral lithotomy is in dealing with very large calculi, and, therefore, I think that perineal lithotomy should get a fair and extended trial in these very difficult cases.

As years go by supra-pubic lithotomy will be less and less employed in India, and will be reserved for those comparatively rare cases to which it is so eminently adapted. The heavy mortality which followed 147 supra-pubic lithotomies may come as a surprise to those who have long laboured under the impression that the natives of India bear all operations for stone in the bladder with a truly wonderful immunity from fatal results. The general surgeon in Europe, who through lack of opportunities can hardly be expected to be very proficient in the use of the lithotrite, marvels at the great success which the skilled litholapaxist in India achieves in dealing with large stones in young and old patients; and, naturally enough, he is inclined to ascribe the great success of his Indian *confrère* in the treatment of stone in the bladder to the greater tolerance of operative interference on the part of the native of India as compared with the native of Europe. He is disposed to account for this remarkable tolerance by ascribing it to the placid disposition of the native of India, to the non-stimulating character of his vegetable diet, and to the fact that he seldom, if ever, indulges in alcoholic beverages. And recently, I note, that the marvellous residual kidney power of the native of India has been pressed into the service to account for the excellent results achieved by litholapaxists in India. Mr. Herbert Milton of Cairo, whose recent papers on lithotomy* have so deservedly attracted much attention, has referred to the extraordinary tolerance of Orientals to all operations and diseases connected with the urinary apparatus.† And no doubt such tolerance does exist among Ethiopians and their descendants, who form no inconsiderable proportion of the native patients who throng the hospitals of Cairo and Alexandria.

* *The Lancet*, April 18th and 23rd, and May 2nd, 1896.
† St. Thomas's Hospital Reports, London, 1891.

But the Egyptian Fellahin, Soudanese, Nubians, and Copts are in temperament very different from the Aryan races of India, and I need scarcely point out the great divergence in physical and intellectual characters between the lower classes of the population of Egypt and those who inhabit our great dependency. An acute, intelligent, and keen-witted Hindu is very different in build and temperament from a sluggish inhabitant of the Egyptian Delta; and the male generative organs of the Soudanese, for example, are altogether on a much larger scale than those of the majority of the population of India. Mr. Herbert Milton tells us that he has been frequently able to introduce a No. 22 evacuating cannula (English scale) into the bladders of his patients at Cairo, and that he usually works with a No. 18 or a No. 20 evacuating cannula. Most surgeons who have done much stone work in India will, I think, bear me out when I state that it is but comparatively seldom that a No. 20 evacuating cannula can be readily passed into the bladder of a Hindu. Then, how can we account for the great measure of success achieved by the skilled litholapaxist in India, if it be not due to the greater tolerance of operative interference by the native of India as compared to that of the native of Europe? The explanation is very simple. The main reason why litholapaxy is more successful in India than in Europe is that, as a general rule, it is done more thoroughly and more skilfully in the former than in the latter. And the reason why it is done more skilfully in India than in Europe is explained by the frequently repeated opportunities which surgeons in India enjoy of practising this operation. But we surgeons who have passed many years of our lives in the calculeous districts of India, must not plume ourselves because we happen to be very expert at working with the lithotrite, and we need not be very proud because we are able to crush a stone in the bladder skilfully and with little danger to our patients. For we have done no more than take advantage of the unrivalled opportunities afforded us in this special department of operative surgery.

Now, if the great success obtained by surgeons in India in litholapaxy depended solely on the peculiarly favourable conditions of their patients, then the novice in litholapaxy in India should obtain as good results as a master of the craft. But this is notoriously not the case. I may cite three examples out of many to illustrate this point. In the July number of the *Indian Medical Gazette* for 1892 I gave an analysis of the first 500 litholapaxies performed at the Indore Hospital, Central India, on patients at all ages. Deducting the litholapaxies in boys, there were 286 operations in males between fifteen and ninety years of age, with 11 deaths, or with a death-rate of 3.84 per cent. But when I come to examine this mor-

talities more closely I find that 7 out of the 11 deaths occurred among our first 52 litholapaxies, leaving a balance of 234 litholapaxies with only 4 deaths. The death-rate among the first 52 litholapaxies was 13.4 per cent., while it was only 1.7 per cent. among the last 234. There was no marked difference in the ages, caste, and general health conditions of the patients who constituted the first division of 52 and the second division of 234, and the average weight and composition of calculi removed from both sections of patients did not differ materially. A death-rate of 13.4 per cent. in 52 litholapaxies was certainly not a very brilliant result; but a death-rate of 1.7 per cent. in 234 litholapaxies left little to be desired. The second instance refers to the work done at Hyderabad, Sindh. Brigade-Surgeon-Lieutenant-Colonel Forbes Keith has placed at my disposal a tabular statement of all operations performed by him for stone in the bladder at Hyderabad during five and a half years ending May 1894. The number of operations was 1933. Eliminating all the lateral lithotomies in boys and men and 57 litholapaxies in females, I find that he performed 676 litholapaxies in adult males with 22 deaths, a rate of mortality of 3.2 per cent.—a result highly satisfactory. He, however, lost 16 patients in his first 111 cases, a death-rate of 14.4 per cent. In his last 565 operations he lost but 6 patients, a death-rate of only 1.06 per cent. As in the case at Indore, there was no marked difference in the ages, caste, and general health conditions of the patients, or in the average weight and composition of the calculi removed in his first 111 and his last 565 litholapaxies. The third instance refers to Surgeon-Lieutenant-Colonel Freyer's experience. In reply to my questions on this subject he writes: "I find that amongst my first 50 litholapaxies there were 3 deaths, or 6 per cent.; but it must be remembered that my earlier cases were selected, the worst cases being subjected to lithotomy. My results have gradually improved as I have gained experience of the operation, so that amongst my last 300 litholapaxies there were only 3 deaths, or 1 per cent., though I rarely use the knife now. As I gain experience of Bigelow's operation amongst Europeans, I am gradually coming to the conclusion that the European stands the operation better than the native of India." Then how can we account for the vast difference in the mortality which followed our first and last series of litholapaxies? The answer is easy. We were learning our work at the beginning, and as soon as we had gained experience and confidence in performing the operation, and had learned how to use the lithotrite with skill and precision our success increased most rapidly. And so, after all, it comes to this, that the bladder and urinary organs of the natives of India, like those of the natives of Europe, become tolerant of the

use of the lithotrite when the surgeon has learned the art of manipulating it with skill and precision.

It is, perhaps, a somewhat ungrateful task to dispel a fondly cherished and consoling illusion of the unskilled litholapaxist in Europe, when he ascribes the great success achieved by his Indian *confrère* in crushing vesical calculi to conditions in the latter's patients which have only a mythical existence. The truth, however, must be told, disagreeable as it often is to hear it; and now, I trust, we shall read and hear no more about the tolerance of the Indian bladder, and of those mythical Indian patients who, though suffering during a long series of years from stone in the bladder, are lucky enough to retain their kidney power unimpaired. In few operations in the whole range of surgery are constant practice and the personal factor of the operator of greater importance than in litholapaxy. No surgeon need hope to acquire a practical familiarity with the lithotrite until he has performed between fifty and a hundred litholapaxies, and even then, he has still much to learn. In the beginning he may be so fortunate as to get a run of a dozen simple and straightforward cases which may not tax his powers of manipulation too severely, but the difficult cases are sure to turn up sooner or later. Then how, it will be asked, is the general surgeon in Europe, who only meets with cases of stone in the bladder at fitful intervals in his professional career, ever to acquire a practical familiarity with the lithotrite? Again, the answer to this question is simple. The general surgeon in England, and throughout Europe, as a matter of fact, seldom, if ever, acquires this familiarity, and he passes away or retires from practice without ever having acquired it. The span of active professional life is too short to learn the art of performing litholapaxy with dexterity and safety to one's patients unless a surgeon has been so favourably placed as to be afforded frequently repeated opportunities of working with the lithotrite. The fact of the matter is that in England and throughout Europe, there are not enough cases of stone in the bladder to go round among the general surgeons, and so if any young surgeon cherishes the ambition of developing into a skilled litholapaxist before middle-age shall overtake him he should go to Egypt or India to learn this special operation. With this object in view, a year spent in the hospital at Hyderabad, Sindh, would be worth a lifetime of practice in England.

THE SO-CALLED KALA-AZAR OF ASSAM.

By SURGEON-MAJOR G. H. FINK, I.M.S.,
Civil Surgeon, Garo Hills District.
(Continued from page 216.)

DR. JOHN GRANT MALCOLMSON, who wrote a prize essay on beri-beri, says that the appellation appears perfectly unintelligible in having crept

into such general use; that a disease of a similar character endemic in Ceylon was also called beri-beri by European medical men from the identity of the two; but that it is unknown by that name among Cingalese. Giles, moreover, tells us that Malcolmson and Pikelharing no doubt describe the same disease if their descriptions be compared; but the disease is not anchylostomiasis, but entirely distinct; and it is more than probable that a certain percentage of their cases are anchylostomiasis. Giles says that he knows from personal observation that anchylostomiasis does exist in the northern part of the Madras Presidency at the present day.

Here Giles admits that a certain percentage of Malcolmson and Pikelharing's cases were anchylostomiasis, thus showing that there is a difficulty in the differential diagnosis for such observers as Malcolmson and Pikelharing not to be able to recognise the one from the other and for Giles to admit that a certain percentage of their cases were probably anchylostomiasis.

Further, Giles tells us that the conditions favourable to the development of the parasite exist in Madras as regards climate, and the habits of the natives would only be required to account for any spread of the disease.

The conclusions one arrives at then, are, that anchylostomiasis is undoubtedly the disease described by Kynsey of Ceylon as beri-beri, but that Malcolmson and Pikelharing's cases are not anchylostomiasis, although a certain percentage probably are, but that most of them are really beri-beri; that there are also conditions in Madras which favour anchylostomiasis as far as climate goes; but that it only requires the habits of the natives for its spread. As far as the habits of the Cingalese and Madrasis are concerned, I believe, that being next door neighbours they are very nearly similar in this respect.

In Assam, Giles tells us, there are favourable opportunities for its spread among a community whose sanitation is so backward. The habits of the Cingalese must be nearer to those of the inhabitants of Assam and to the Garos than to their next door neighbours the Madrasis which, to say the least, seems improbable.

If there are conditions in the climate of Ceylon, Madras and Assam which favour the spread of anchylostomiasis, the habits of the people though important might be considered favourable in all these places; but perhaps more favourable in one than in another.

Giles, in page 254 of the *Indian Medical Gazette* for July 1896, under the head of Kala-Azar, has discovered some cases of anchylostomiasis in the Saharanpore Jail; whilst Surgeon-Lieutenant-Colonel Moran, in page 431 of the same *Gazette* for November 1896, has discovered anchylostoma in 91 per cent. of the *post-mortem* examinations on the bodies of convicts in the Gorakhpur District and Jail.

The climate of the N.-W. P. and Oudh from Giles' previous statements already mentioned would favour anchylostomiasis, and the habits of the people and their insanitary condition would presumably be at the low standard and as backward as in Assam, only now so in the Gorakhpur District and Jail, unless it is that the coolies imported from the N.-W. P. and Oudh have found their way back to their districts after serving in Assam where the disease has been contracted.

Moran tells us that Giles predicts that anchylostomiasis will become a "veritable scourge" in many parts of the N.-W. P. and Oudh and Bengal; if so, is this due to any alteration in the climate or the habits of the people, or is bad sanitation alone held responsible for this scourge? If the importation of coolies into Assam is carried on largely from Bengal and the N.-W. P. and Oudh, it is naturally to be expected; and then the question arises did these coolies bring the disease into Assam from their homes in the N.-W. P. and Oudh, or was the disease contracted in Assam? From Moran's account it seems to me that 91 per cent. of the cases he has examined proves its existence in Gorakhpur for some years past, for such a large percentage has not been recorded in Bengal nor in Assam, I believe.

The climate and the habits of the people in the Gorakhpur District are doubtless both present as favourable conditions for anchylostomiasis for so many cases to present the unmistakable signs, unless the district jail is the "Indus" in which it breeds, owing to the most highly favourable conditions in its surroundings.

Surely the increased supply of pure water and other progressive sanitary works in the N.-W. P. and Oudh should do away with all fear of such predictions on the part of Giles? As regards the habits of the natives of India, they seem to me to be equally bad throughout the country generally, and on the average throughout any particular part of the country. The majority have many very insanitary habits, and the one which seems generally the most objectionable, is utter disregard for perfecting the water-supplies from pollution,—the very water which is now contaminated is now drunk, and which is now drunk is now washed in.

Along such large streams as the Ganges and Jumna, whose waters Hankin has lately analysed, and are said to be comparatively free from micro-organisms, one can imagine that such practices in the daily lives of the population would not matter so much; but every village in India is not so fortunate as to have a Ganges or a Jumna whose waters possess such high qualities for drinking purposes.

Let us, however, trust that with the progress in sanitation which the N.-W. P. and Oudh have been making within the last few years that the predictions regarding anchylostomiasis

will not come to pass. I was glad to observe that Giles failed in his search for anchylostomata in the Bijnor District.

Giles also considers that some of the cases in Japan known as kakke, might also be examples of anchylostomiasis.

In Virchow's Archiv., Vol. XXI, p. 290, for 1877, we are told that Wernick wrote a paper on the Japanese variety of beri-beri, and, according to Pekelharing, he devoted his article to proving that beri-beri was a pernicious anæmia. Pekelharing tried to demolish Wernick's views by stating that anæmia is by no means a necessary or even common symptom of beri-beri (as he had seen it). Giles thinks that Pekelharing and Wernick were both describing two distinct diseases. Pernicious anæmia, according to Giles, is clinically the most salient symptom of anchylostomiasis. Wernick's beri-beri of Japan would therefore probably be examples of anchylostomiasis.

In page 7, para. 1 of his pamphlet, Giles says: "Now this epidemic affection of the nervous system presents not the least similarity with anything met with in Assam." Moreover, he asks us to compare these accounts (Wernick's and Pekelharing's) with Dr. Kynsey's pamphlet, p. 5, para. 26. "In the one disease," he says, "the prominent character is paresis, anæmia is an after and unessential complication; in the other, the leading symptom is anæmia, and no true paralysis ever occurs."

Although my experience of Assam is too brief to enable me to speak with the same authority on the subject as Giles, yet, during my short sojourn of about six months in the Garo Hills, the disease kala-azar has absorbed a great deal of my thought and attention, and I have met with these cases among Garo Native Christians, which do not seem to bear out Giles's statement with regard to paresis. The three cases were in young Garos of 18, 19 and 20 years of age respectively. The medical history of all these cases, which I have carefully ascertained, were an attack of fever which preceded loss of sensation, which began in the toes, and spread gradually up the limbs. The most pronounced of these three cases (Makhal) is a thin, dark skinned, spare lad, 5' 4" in height, of fairly healthy appearance, clean looking and intelligent.

From his family history, it appears that his father died of kala-azar; his mother and a brother are living and healthy. His present illness began two years ago with fever; he says he had kala-azar, and that he also passed a number of small worms.

His present state shows him to be apparently healthy, except that he has slight hypertrophy of the spleen; his appetite is poor, but he is not anæmic, and he has partial loss of sensation as far as the knee-joints, particularly over the region of the peronei muscles; his gait is peculiar, not that of locomotor ataxy which is so very

characteristic, but his legs are somewhat wide apart in walking, inclined to be knock-kneed at the same time, whilst he drags his feet along, has great pain in the soles, and a tingling sensation as far as the ankles. Cramps are occasionally felt in the legs. His eyesight is good, urine normal, knee-jerk exaggerated. The other two cases (Modhan and Jangran Garoxians) also give a history of fever, preceeding the partial loss of sensation, which at present only extends as far as the toes. Both appear to be healthy and in good condition, and say they never had kala-azar nor worms. Their spleens are slightly enlarged: but there is nothing peculiar in their gait.

Makhal, moreover, states that three years ago several cases similar in character to his occurred in the Baptist Mission compound, and there were enlarged spleens accompanying them.

The above cases certainly point to disturbance of the nervous system subsequent to attacks of fever, and not attended by anæmia.

I have seen several so-called cases of kala-azar in the Garo Hills, and the above three cases have no resemblance whatever to that disease, but certainly resemble cases of malarial fever and cachexia which I have witnessed in India, Burma, the Punjab, South Afghanistan and Biluchistan, and most nearly allied to the worst forms of malarial cachexia.

I must also state that I have seen cases in the N.-W. P. and Oudh, particularly along the foot of the Siwaliks, which strongly resembled cases of so-called kala-azar in the earlier stages of anasarea and anæmia.

Malarial fever will invade almost any organ in the body, and although it has certain general characteristic features which are too well-known to be called by any other term than malarial fever or cachexia, yet there are certain special characteristics it possesses in certain districts or portions of India, depending upon peculiarities of climate which control the behaviour of the poison. Its worst forms are manifest in certain terai regions, and where the nervous system becomes affected early, the poison has reached a certain intensity which seems to be favoured through the peculiarities of climate which are suitable for such intensifying effects.

Malaria will invade almost any organ or set of organs in the body. The poison will suddenly be excited by such conditions as cold and chill of the surface of the body. Or if the body has been subjected to undue exertion and has perspired freely and is fatigued, it will begin to manifest itself by a feeling of lassitude and disinclination to move, a desire to yawn or stretch one's limbs, or a goose-skin feeling over the surface of the whole body. In some cases it will produce urticaria or a desire to itch

all over, in other cases a severe headache or neuralgia. All these various manifestations of the presence of the poison are to be seen in the Garo Hills, especially in down country people. The effect of the malarial fever is a feeling of great prostration in 24 to 48 hours. Malarial fever is the prevailing disease in Tura and in the district. The accompanying tables give the vital statistics of the registration circles or areas, the relation of rainfall and its attendant variations of temperature to health and the mortality from the principal diseases in the registration areas from 1894 to 1896.

I must not fail to mention, however, that registration of births and deaths through chowkidari or police agency has only been in existence for the last three years (1894 to 1896). The population of the registration circles is 27,725, whilst that of the Garo Hills District is 121,570, according to the last Census of 1891; hence the registration areas comprise less than a fourth of the total population, and the figures, though useful in a measure, are open to criticism from a statistical point of view.

TABLE 1.—(DISTRICT).
Showing the Vital Statistics of the Garo Hills Registered Circles from 1894 to 1896.

REGISTERED CIRCLE.	Population of Circle.	BIRTHS.				DEATHS.				Deaths ratio per 1,000 of popula- tion.	Total.	Deaths ratio per 1,000 of popula- tion.		
		1894.		1895.		1896.		1897.					1898.	
		M.	F.	M.	F.	M.	F.	M.	F.				M.	F.
Tura Station	1,046	17	20	31	34	17	16	23	34	19	21	22	151	48.11
Dalu	1,375	39	45	32	32	49	61	25	35	24	62	53	235	56.95
Mohendrogrunge	5,140	75	84	110	112	113	117	61	39	62	90	87	543	33.21
Garobadha	4,051	47	69	95	100	89	89	48	40	23	97	115	558	45.91
Fulbari	10,113	157	163	239	234	244	235	1,272	20	31	186	213	1,092	22.59
TOTAL	27,725	335	381	507	512	512	518	2,765	42	34	457	443	2,579	41.75

TABLE 2.

Shows the relation of Rainfall and its attendant variations of temperature to Health.

MONTHS.		TEMPERATURE.						RAINFALL						DISEASES PRESENT.														
		1894.		1895.		1896		Rainfall.			No. of days it rained.			1894.				1895.				1896.						
		Max.	Min.	Max.	Min.	Max.	Min.	1894.	1895.	1896.	1894.	1895.	1896.	Fever.	Kala-azar.	Cholera.	Small pox.	Dysentery & Diarrhoea.	Fever.	Kala-azar.	Cholera.	Small pox.	Dysentery & Diarrhoea.	Fever.	Kala-azar.	Cholera.	Small pox.	Dysentery & Diarrhoea.
January	...	75.0	52.0	75.1	51.0	74.4	57.4	.	0.16	1.08		2	2	25	7	.	.	7	52	1	.	.	.	30	4	10	3	3
February	...	83.2	56.3	83.6	60.6	78.6	63.5	0.37	0.05	0.05	4	1	1	15	3	.	4	37	37	.	.	.	51	4	1	1	1	
March		95.5	59.8	91.6	58.4	88.8	70.1		1.52			4	4	61	5	.	.	30	30	.	.	.	66	2	15	8	8	
April		97.3	61.2	92.2	63.2	91.3	73.0	5.71	9.44	7.45	14	12	10	63	5	1	.	39	39	.	.	.	40	7	8	.	.	
May	..	95.0	60.1	92.5	61.8	85.0	69.3	15.44	9.10	26.96	20	18	25	50	4	2	3	44	1	.	.	.	54	3	2	4	4	
June		89.4	69.1	94.8	76.1	85.5	76.0	22.89	10.94	19.04	22	22	26	71	3	.	4	72	1	.	.	.	90	16	2	3	3	
July		89.5	71.0	87.5	71.2	86.2	74.8	16.52	44.66	22.91	20	27	22	66	4	1	3	34	5	5	13	5	86	3	1	9	3	
August		87.5	70.5	88.2	72.2	85.3	73.1	13.89	14.55	9.50	26	26	22	54	2	1	2	45	5	5	.	4	59	7	2	5	5	
September	...	86.5	69.6	90.5	71.1	84.4	70.4	18.79	15.16	21.74	23	15	20	35	2	2	2	45	3	3	3	38	6	1	1	7		
October		87.5	62.3	88.6	59.8	85.2	62.1	14.41	0.44	1.83	17	3	4	45	1	...	1	48	8	.	.	1	44	17	1	7	7	
November		80.5	57.3	83.4	59.8	79.9	61.2	0.96	0.71	0.09	3	3	2	30	6	...	3	44	8	.	.	3	48	4	1	1	1	
December		78.2	50.0	80.4	55.0	74.6	56.9	0.49	0.21	.	1	1	..	47	1	...	1	45	5	.	.	1	44	1	.	.	.	
								109.49	106.94	110.65	150	134	134	552	40	3	2	30	536	37	5	13	27	650	74	43	11	28

TABLE 3.

Shows Mortality from principal Diseases in Registration areas.

YEAR.	Fever.	Cholera.	Small-pox.	Dysentery & Diarrhoea.	Kala azar.	TOTAL.	Ratio per 1,000 of population.	Population Census of 1891.	Relative position for bad health.
Tura.									
1894	30	3	...	1	1	35	33.46	1,046	III.
1895	23			9	3	35	33.46		
1896	28	1		5	3	37	35.37		
	81	4		15	7	107	33.14	4,051	II.
Gaiobadha.									
1894	126		1	13	3	143	35.29		
1895	153	5			3	166	40.97		
1896	172	20	2	1	11	206	50.85		
	456	20	3	14	17	515	42.04	16,113	V.
Fulbani.									
1894	198			9	16	223	13.83		
1895	169	...	13		9	191	11.85		
1896	279	16	9	5	43	352	21.84		
	646	16	22	14	68	766	15.84	1,375	I.
Dalu.									
1894	53	"			6	59	42.90		
1895	47				11	58	42.18		
1896	61	3		17	7	88	64.00	5,140	IV.
	161	3		17	24	205	48.48		
Mohendragunge.									
1894	1	..	1	6	6	166	32.29		
1895	153			14	7	157	30.54	27,725	
1896	136		...		7	114	22.17		
	107								
	396	..	1	20	20	437	28.33		
Relative position of disease	1,740 I.	48 IV.	26 V.	80 III.	136 II.	2,030	33.56		

From Table II will be seen the temperature and rainfall for 1894 to 1896, the number of days it rained, and the amount collected, with their relation to the mortality in Tura station and the district for the five principal diseases which became more prevalent month by month. In Table III, the five principal diseases which create mortality in the five circles for the three years 1894 to 1896 will be observed. In this table will be noticed also the prevailing mortality for each registration area collectively for the last three years, and the relative position of each area which has caused the highest death-rate.

Dalu stands first with its highest death-roll, then Garobadha, then Tura, then Mohendro-gunge, whilst Fulbari with its largest population stands first for health.

(To be continued.)

SOME SUGGESTIONS AS TO THE TREATMENT AND AFTER TREATMENT OF CATARACT DERIVED FROM AN EXPERIENCE OF 1,100 CASES.

By SURGN.-CAPT. R. H. ELLIOTT, M.B., B.Sc., F.R.C.S.

(Chapter II, continued from page 179.)

ACCIDENTAL INJURY TO THE IRIS DURING THE PERFORMANCE OF THE SECTION.

It is but seldom that a knife in fairly skilled hands inflicts an injury on the iris between the moments of puncture and counter-puncture. Should such an accident occur, it is, as a rule, easy to withdraw the blade till it is free, and then reintroduce it. If, however, this cannot be done without risk of loss of aqueous, it is better to push the knife boldly on, and complete the section, as though nothing had happened, first, however, warning the patient not to squeeze the eye should the section give him pain.

A much more common complication is that of injury to the iris, while the surgeon is making the saw-like movements, which complete the section. In this way, the membrane may be scraped, nicked or cut. One or other of these accidents is predisposed to by the occurrence of any of the following conditions:—

A.—Shallowness of the Anterior Chamber.—As a rule, it is possible, even in very shallow chambers to avoid injury to the iris by imparting a slight forward inclination to the edge of the knife during the section. Care must be taken, however, not to exaggerate this forward tilt, or a corneal section will result. Practice alone will enable the surgeon to strike the happy mean.

B.—Sudden upward movement of the patient's eye.—Such a movement may result in one of two misfortunes:—

- (i) The aqueous may escape at the points of puncture and counter-puncture owing to the altered relations be-

tween the knife and the plane of section, causing the apertures to gape. Where the chamber is emptied, it is, of course, impossible to avoid cutting the iris in the section.

- (ii) The sudden movement of the eye and possibly also a partial escape of aqueous may cause a folding of the margin of the iris over the edge of the knife.

C.—Undue pressure on the eye-ball, with the point of the forceps, which are used to steady the eye.—If one watches an inexperienced operator, one will commonly notice, that instead of merely fixing the ball with the forceps he either presses upon it, or tugs unduly in the opposite direction on the conjunctiva. Either of these manœuvres is a mistake. The forceps should be held with a free hand, so that the eye-ball is merely steadied, without any alteration in its natural condition of tension. Undue pressure with forceps below pushes the upper part of the iris towards the cornea, instead of allowing it to lie flat in its normal position.

Treatment of injury to the Iris.—As has already been stated, an iris which has been nicked or scraped during section may often be safely left without further interference, as soon as the cataract has been extracted. It is, however, probably safer in most cases, especially if much injury has been done to perform a free iridectomy, and thus remove the injured tissue.

When the surgeon notices that his knife is fouling the iris, he may often, by a little manipulation, get the edge of his knife over the membrane, and complete his section, doing little or no damage. If, however, he finds it impossible to do this, he should boldly complete his section making no effort to spare the iris, but rather endeavouring to perform a free iridectomy with his knife. Iris forceps and scissors will, if necessary, tidy up the coloboma he has made; he should, however, in all cases, first warn the patient not to squeeze the eye, should pain be experienced: for, though as a rule, cocaine anesthetizes the iris, one finds cases, especially in nervous people, in which the membrane is still partly sensitive.

Some surgeons have described complicated manœuvres by means of which they profess to hook down the iris, and so save it in all cases. Apart from the facts that these methods are complicated, and require the use of another hand, and the introduction of another instrument, they appear to the writer to be highly unnecessary, unless iridectomy is to be regarded as an evil in all cases, a position, which even the most zealous advocates of the simple operation would hardly venture to take.

Indications for vectis delivery of cataract. The above have already been stated to be—

- (a) threatened or actual escape of vitreous in the course of the operation, and

(b) adhesion of the lens to the iris. These may now be discussed more at length.

Escape of vitreous arises from rupture of the zonule of zinn, or of the posterior capsule of the lens. — Such ruptures may be produced in several ways—

- (a) by undue backward pressure whilst needling a hard cataract;
- (b) by the use of unjustifiable force during the delivery of the lens;
- (c) by sudden pressure brought to bear on the globe owing to a violent contraction of the orbicularis muscle.

In some patients especially in those with an abnormally fluid vitreous, an escape of this substance can only be avoided by the greatest delicacy of manipulation.

Sudden spasm of the eye-lids is usually due to nervousness on the part of the patient. The probability of its occurrence is, however, greatly increased by want of skill on the part of the operator. Should the iris be cut in the section, or should the point of the knife during the completion of the section be made to impinge on the skin surfaces around the inner canthus, the patient will sometimes involuntarily squeeze the eye.

The least threatening of vitreous-escape is an indication for the cessation of all attempts to deliver the lens by pressure. The speculum must at once be lifted from the eye, and so held by an assistant that it exerts no pressure on the ball while, at the same time, it keeps the lids well lifted from the globe. The patient is directed to look steadily down. A free iridectomy is performed, and the loop-*vectis* is boldly introduced behind the lens. The cataract is now delivered by the aid of this instrument, the iris edges are returned to position, and the eye is closed. The writer has had frequent occasion to practise these manœuvres and can strongly recommend it. In really every case, one notices on the following day a curious cloudiness of the cornea, which is commonly described as keratitis. The appearance of this phenomenon is highly characteristic, it may only occur in the neighbourhood of the section, or may involve a large part of the whole of the cornea. On careful inspection the cloudy area appears to be broken up into a number of spaces by a fine network of channels, which are clearer than the surrounding areas.

This same appearance is also noticed commonly in cases in which a large hard cataract has been expressed with some difficulty through a section. In all cases the appearance is best marked in the neighbourhood of the section to which as above stated, it is often confined. The clinical course of the complication is, as far as the writer's experience goes, invariably the same. In a few days, or at the most, and then only in rare cases, after a week or more, the condition clears up absolutely. Taking into account the circum-

stances under which it is seen, the site of its occurrence, and its clinical course, the writer is disposed to believe that it is due to an abrasion of the epithelial cells lining the posterior surface of the cornea, and that it is not a true keratitis at all. The delicate cells of Descemet's membrane are evidently roughly treated during the escape of a large hard cataract through a section. Still more so is this the case in *vectis* delivery, since the point of counter-pressure of the instrument must evidently be the posterior surface of the cornea.

Treatment of Cataract with posterior Synechia.—In cases in which a moderate amount of adhesion exists, a cataract can usually be safely extracted by performing an iridectomy, and then extracting with the *vectis* in the manner already described. The free use of atropine, both before and after operation, is indicated.

We may now discuss in detail the various steps of the operation:—

Needling.—Preliminary needling has advantages over the use of the cystotome, *viz.*:—

- (a) It is a very easy method and enables the surgeon to see clearly what he is doing. The iris is therefore in no danger of being injured. With a very moderate amount of skill, a needle can be introduced into even the shallowest chamber without catching in this membrane.
- (b) The laceration of the capsule can be effected without any need of haste, since at this stage there is no risk of an escape of vitreous, even should the patient attempt to squeeze the eye.
- (c) The surgeon can confirm his diagnosis as to the nature of the cataract, for the needle in an experienced hand is practically a probe, and thus its use throws valuable light on the after stages of the operation.

There are a few points of interest as to the method of needling, and as to the information which this proceeding affords. It is essential that the needle should be very sharp, and that it should have cutting edges.

Into the cortico-nuclear cataract the needle edge sinks easily. As a rule, the capsule of a Morgagnian cataract readily bursts when incised giving exit to a cloud of turbid fluid, which, though it may obscure the details of the anterior chamber, compensates for this disadvantage by very sensibly deepening the chamber, and thus enabling the operator to avoid cutting the iris. In a few cases one finds the Morgagnian capsule extremely tough. If so, the needle must be withdrawn, and the membrane lacerated with the point of the knife before the section is made. Such cases are, however, fortunately rare.

The feel of a hard cataract is characteristic, and in the endeavours to lacerate its capsule, the

lens may be seen to recede towards the posterior chamber. In such cases the greatest care must be exercised, so as not to apply undue force; the point of the needles should be introduced obliquely into the cataract, and the laceration effected by cutting forward with the edge of the needle into the anterior chamber. Should this precaution be neglected, and undue backward pressure made, the ligament of the lens may easily be ruptured, in which case a vitreous escape will probably occur.

The Section.—Having confirmed our diagnosis as to the nature of the cataract by needling it, we are in a position to judge the size of the section that will be necessary for the safe delivery of the lens. It need hardly be said that the smaller the section consistent with safety, the better; a hard cataract, especially if large, will require a large section, while a Morgagnian cataract, with a very small nucleus, can be safely delivered through a correspondingly small section. A cortico-nuclear cataract can be delivered through a moderate incision, but a hard cataract with degenerate cortex, though it will readily pass through a much smaller section than a simple hard cataract of corresponding size, will nevertheless do so at the expense of the stripping off of flakes of its peripheral matter, which will thus be left in the chamber and be difficult to evacuate.

As to the absolute size of the section in any given case, it is difficult to speak. A section which takes as its flap one-half of the circumference of the cornea is the largest that the writer uses.

Should even this prove insufficient, and such would very rarely be the case, it is preferable to perform an iridectomy rather than to further enlarge the section.

In no case is it well to press a cataract out through too small an aperture. Apart from the dangers of vitreous escape, there is the risk that the overstretched iris will subsequently prolapse.

Whatever the nature of the cataract, should one's judgment have failed and the section prove too small, delivery can often be effected with ease after a free iridectomy. If, however, we are still at a loss, the section *must* be enlarged. This can most easily be done with a pair of straight sharp-pointed iridectomy scissors, the incision being there continued in the corneo-scleral margin on one or, if necessary, on both sides.

In young and healthy subjects, a pure scleral-corneo incision heals at once, but in elderly subjects, or where there is any tendency to catarrh, the writer believes that a conjunctival flap is a great safeguard against leaking section and its attendant dangers, as it insures a very early and complete closure of the chambers. The hæmorrhage attending this form of section sometimes obscures the subsequent details of

the operation, and indeed the conjunctival flap thrown down over the upper margin of the cornea, is often itself a decided bar to one's obtaining a clear view of the corresponding part of the chamber.

The writer's experience of a section through the cornea itself is almost entirely limited to the practice of others. The danger of prolapse of the iris into such a section is very great, and he has seen quite enough instances of this accident to effectually deter him from risking its occurrence.

The introduction of the knife, with its edge turned the wrong way is a serious accident, which one has seen occur on more than one occasion to other operators, but which fortunately has never happened to oneself. The line of treatment indicated appears to be a withdrawal, and careful reintroduction of the knife after the chamber has refilled.

The section having been completed, the question as to the needs of an iridectomy at once arises. Probably no point in cataract surgery had been more debated than this. The simple operation, and the operation with iridectomy each have had and still have their zealous advocates. The path of greatest success probably lies, as is so often the case in the golden mean, and one cannot too strongly insist on the necessity of dealing with each case on its own individual merits.

In favour of the simple operation are:—

(1) The lessened amount of injury to the parts; and

(2) The preservation of the natural pupil.

As to the first consideration, it seems hardly necessary to point out, that in this, as in any other surgical procedure, we reduce to their lowest ebb the subsequent risks of the operation, if we minimise the injury inflicted, and at the same time shorten the whole proceeding.

Now as to the second point, the preservation of the natural pupil entails a triple advantage since—

(a) it gives better æsthetic results:

(b) it endows some eyes at least with a modified power of accommodation, which, after the extraction of the lens, they could not otherwise possess. (This power is probably due, when it exists, to the control exercised by the iris over peripheral rays):

(c) it retains the control over its light supply, which is so important a function of the normal eye.

One must acknowledge, however, that these advantages may be bought too dearly, and that the simple operation is by no means so safe a procedure as some would have us believe. The drawback to this method may be stated as follows:—

(1) A greater difficulty in clearing the anterior chamber of blood and debris.

(2) The danger of iritis, when the iris has been stretched or bruised during delivery of the lens.

(3) The danger of prolapse of the iris through the section.

Of these objections, the most serious by far is the danger of prolapse. It is important to remember, however, that even when an iridectomy has been done, the edges of the iris may become impacted in the angles of the section if due care be not taken to repose the membrane carefully. Confining our attention to those cases in which prolapse complicates the subsequent course of a simple operation, there can be no question that such an accident very seriously impairs the prospects of a successful termination of the case.

On reviewing the statistics of 1,068 consecutive cases of cataract extraction performed by the writer in hospital practice, this statement is strongly illustrated. In 409 cases an iridectomy was performed at the time, and the records show that 7.5% of these cases failed. In 659 cases the simple operation was performed and 8.5% failed. If, however, we separate those cases of simple extraction, in which a prolapse of the iris complicated the subsequent course of treatment, from the cases not so complicated, the former show 20.3% of failure, while the latter show only 6%. It is, therefore, obvious that in the series under review the less favourable aspect of the cases of simple extraction is due to the frequency of occurrence of this dangerous complication.

Under the influence of the example of experienced surgeons, the writer started cataract extraction with the belief that iridectomy was to be avoided, if possible. Little by little, he was led to alter these views, and to believe that though the simple operation is an ideal method, when it can be safely performed, yet there are very many circumstances under which its use is strongly contra-indicated. He now holds that in cataract extraction, an iridectomy must be performed under the following circumstances:—

(1) *Where there is difficulty in delivering the lens.*—It will not infrequently be found that after the completion of the section, the lens refuses to present under ordinary manipulation; but it will usually do so quite readily after a portion of iris has been removed. In such cases the section has been too small for safe delivery with an intact iris.

In many such cases, one can deliver the lens by the use of a little extra force, but if we adopt this course we run two risks, viz.:—

(1) That of a rupture of the suspensory ligament, leading to an escape of vitreous; and

(2) that of an overstretching of the iris at the point of delivery. Such an overstretching is liable to paralyse the stretched portion, and thus to render it more likely to prolapse into the section under the influence of pressure.

(2) *Where we have cause to suspect that the lens is hard and of large size.*—A large hard lens is likely to bruise and overstretch the iris, during delivery, thus entailing a danger of subsequent iritis. I believe this to be the principal reason for the fact that the advocates of the simple operation have had to record a greater percentage of failures in the treatment of hard cataract than in that of any other variety. If the mistake has been committed of delivering such a cataract without iridectomy, it is a wise and safe procedure to perform a free iridectomy, thus removing the bruised and torn portion of iris, and thereby minimising the danger of subsequent iritis.

(3) *Where the iris has been cut or scraped by the edge of the knife during the section.*—This accident may happen, and yet an uninterrupted recovery may take place without iridectomy, but on the whole, it seems a safer procedure to remove a portion of iris in these cases, if much damage has been done by the knife.

(4) *Where it is found difficult to clear the chamber of debris, after the delivery of the lens.*—A distinction has been drawn between the soft matter of a genuine cortico-nuclear cataract and the cheesy degenerative material, which is found on the periphery of some long-standing hard cataracts. When a small quantity of the former semi-fluid matter is left behind, it involves no appreciable risk in the writer's opinion; but should the quantity be greater, it is advisable to deliver it, an iridectomy being performed if necessary for this purpose. On the other hand, when dealing with the latter substance, every care should be taken to clear the chamber thoroughly. This cheesy material, instead of escaping through the pupil, tends to find its way under the iris, where it is a distinct source of danger, as it absorbs moisture, and swells up, thus increasing the tension of the eye; it further irritates the iris with which it is in contact, producing local or general iritis. When it is found that, after delivering a cataract of this nature, cheesy material has been left behind, it is always well to remove a portion of the iris, and then to complete the evacuation of the chamber.

(5) *In delivering a Morgagnian Cataract with a small nucleus, it is not uncommon for the nucleus to slip behind the iris and thus be lost to sight.*—Under these circumstances, injudicious attempts to deliver, without iridectomy, will probably result in an escape of vitreous; whereas the nucleus will speedily present, if a portion of iris is first removed.

(6) *When after the delivery of the lens the tension of the eye appears to be high,* an iridectomy should undoubtedly be done. This high tension condition may be easily diagnosed by inspection of the iris. Should the iris prolapse into the wound, and re prolapse after it has once been carefully replaced, we are safe in concluding

ing the simple operation to be unjustifiable; but short of this, a vertical elongation upwards of the pupil is a valuable danger-signal; and if the condition continues after a fair attempt has been made to put the iris back in position, it is better to do an iridectomy at once. The writer has noticed that the tendency to prolapse of the iris is more common in Morgagnian than in any other form of cataract.

(7) *Where any indication for vectis delivery exists*, it is well to perform an iridectomy before introducing the vectis. This preliminary step makes the introduction of the instrument, and the withdrawal of the lens, easier than they otherwise could be. The indications referred to are:

(a) threatened or actual escape of vitreous during the course of the operation, and before the lens has been delivered:

(b) adhesion of the lens to the iris.

It will thus be seen that the writer would reserve the simple operation for those cases in which the lens is easily removed, in which no debris is left behind, or at the most, only a moderate quantity of soft cortico-nuclear matter, and finally in which the iris is not overstretched or bruised, and does not tend to prolapse. He further inclines to the belief that the wholesale use of atropine is a mistake, if the surgeon means to dispense with iridectomy when possible. In the great majority of cases homatropine will produce quite sufficient dilatation of the pupil, and as its action passes off rapidly the tendency to prolapse will be greatly lessened. If for any reason, it is decided beforehand to operate with iridectomy, there is of course no objection to the previous instillation of atropine. In any case in which prolapse is to be feared, it is well to instil eserine immediately after operation; this is quite a safe procedure.

A REPORT ON THE EPIDEMIC OF BUBONIC PLAGUE AT HONGKONG IN THE YEAR 1896.*

BY STAFF SURGEON WILM OF THE IMPERIAL GERMAN NAVY.

(Continued from page 209.)

In the fæces, especially when the stools contained mucus and blood, the plague bacillus was frequently found, but its presence could be demonstrated with certainty by culture experiments only. The examination gave a positive result in 38 out of 45 cases. In 28 of these cases there were no buboes.

In the albuminous urine of 40 patients suffering from plague, plague bacilli were found in every case. They could usually be detected by simple microscopical examination; frequently also in pure cultures. Sometimes the urine con-

tained also pus-cocci. The bacillus was never detected in the sweat.

B.—THE BACILLUS OF BUBONIC PLAGUE.

The plague bacillus is a short, thick rod with rounded ends, about 1μ in length and 0.3μ in breadth. The bacillus is non-motile. It is stained by all basic aniline dyes, but is not stained by Gram's method. In simple stained cover-glass preparations of the blood and the organs, the ends of the bacillus stain much more deeply than the middle. Often the ends of the bacillus remained entirely unstained, so that it has the appearance of a diplococcus. Sometimes the bacillus is surrounded by a clear area. Very frequently the bacillus is found in the interior of the white blood-corpuscles.

The bacillus grows in artificial nutritive media, both at the temperature of the blood and at the ordinary temperature of the room. The optimum temperature is 37°C . Below 25°C . a decline in the rapidity of growth becomes noticeable. The bacillus thrives better on nutritive media containing glycerine than on those made without the admixture of this substance. Spore-formation was never observed.

On gelatine plates the bacillus grows without liquefying the medium, and produces in 48 hours small, round, greyish-white colonies. When these are examined microscopically, they have at first the appearance of ground glass, and later a darker, granulated appearance, sometimes with notched borders.

In gelatine puncture and streak cultivation, the bacillus grows slowly to form grey or greyish-white cultures without liquefying the gelatine.

On agar plates, the bacillus forms within 24 hours small, round, greyish-white colonies, of the size of a pin's head, which by reflected light show a bluish sheen with iridescent borders. The colonies usually reach the size of a lentil only, and remain isolated. Frequently, however, some of the colonies increase considerably in size after a few days, and outgrow the others. Old colonies on agar plates have usually a ragged appearance.

If from the colonies just described, puncture and streak cultivations upon agar are made, it is found that tubes inoculated from the smaller colonies show a scantier growth than those inoculated from the larger colonies. The streak cultivations on agar appear white or greyish-white, and show by reflected light a bluish sheen. The puncture cultivations have a whitish appearance along the depth of the insertion, and extend but little superficially from the point of inoculation.

The growth of the bacillus on bouillon is very characteristic in this respect, that it resembles that of "the streptococcus pyogenes." The growth forms at the bottom and along the sides

* Translated for the Government of Hongkong by Maurice Eden Paul, M.D.

of the test-tube as a granular or flocculent precipitate, while the bouillon itself remains clear. If the tube is shaken, the precipitate is distributed throughout the fluid. The cultures do not give the indol-reaction.

On potato the growth is very scanty. At blood-heat, in from 36 to 48 hours very delicate greyish-white or white crusts are formed. At the temperature of the room the growth is not apparent until after three or four days.

Sterilised milk is curdled by the bacillus.

The most favourable culture medium for the bacillus is a 2% alkaline solution of peptone containing 1% of gelatine.

In stained covered-glass preparations from artificial cultures, the bacillus has usually the appearance of a diplococcus. Very frequently four to six of such bacilli lie joined together in a chain, and they then resemble streptococci. Such appearances are seen most often in cultures in bouillon, and in hanging-drop cultivations. Frequently, especially in old cultures, bulging, oval almost spherical forms are seen. In old cultures the bacilli stained less readily.

Experiments on the inoculability of bubonic plague were made on all kinds of animals, both with fragments of the organs and with pure cultures of the bacillus. The most susceptible to inoculation were rats and house-mice, which died in great numbers during the epidemic; next in order of susceptibility came white mice, guinea-pigs, rabbits, pigs, monkeys, and fowls. Cats became feverish after inoculation, but did not die. Pigeons were non-inoculable.

Subcutaneous inoculation of rats, house-mice, white mice, guinea-pigs, and rabbits with fragments of the organs of patients that had died of the plague killed the animals in from one to six days. Mice died usually in from one to three days, rats in from two to four days, guinea-pigs according to their size in from two to five days, rabbits in from four to seven days. Soon after the inoculation the animals' temperature rose to 40° C. (104° F.); they sat with ruffled fur in a corner of the cage; they lost appetite; shortly before death they fell suddenly on the side, and died in convulsions, which sometimes lasted two or three hours.

On *post-mortem* examination there was found at the site of inoculation a hæmorrhagic, gelatinous exudation; there was inflammation of the lymphatics leading to the nearest lymphatic glands; these glands were red and swollen, and often imbedded in a yellow, gelatinous exudation. The lungs were usually congested; the right side of the heart was usually distended with bluish-black blood; the liver was red and swollen; the spleen was bluish, much swollen, and frequently studded with small follicles. The kidneys and the adrenals were congested and usually swollen. Intestine was often congested and the mesenteric glands were sometimes moderately swollen and congested. In the various

organs, especially in the lymph-glands, the liver, the kidneys, the spleen, and the blood, the plague bacillus was present; it was usually found also in the urine and in the fæces.

When subcutaneous inoculations of pure cultures were made in animals, it was found that the virulence of the cultures was very variable. Cultures of the third and fourth generations proved much less virulent than those of the first and second generations; and cultures derived from the larger, over-grown colonies on agar plates were much less virulent than cultures derived from the smaller colonies on the same plates.

If fresh cultures of the first generation were used for subcutaneous inoculations, the bacilli being those growing in the smaller colonies on agar plates, which colonies had been directly derived from the organs, blood, or urine of plague patients, the inoculated mice, rats, guinea-pigs, and rabbits, died according to their size, in from one to twelve days. Mice died as a rule in from two to seven days; rats in from four to five days; small guinea-pigs weighing from 150 to 200 grammes, within five days; large guinea-pigs weighing from 400 to 500 grammes in from five to nine days; and rabbits in from seven to twelve days. The appearances on *post-mortem* examination were identical with those seen in animals inoculated with fragments of the organs. The less virulent cultures always gave rise to fever on inoculation, and were fatal to mice; they were seldom, however, fatal to rats; still more rarely fatal to guinea-pigs. When fatal, the duration of the illness was longer than in animals of the same species inoculated with the more virulent cultures. Rabbits inoculated with the less virulent cultures suffered from fever, but were not killed.

Intra-peritoneal inoculations caused great swelling of the intestinal follicles and of the mesenteric glands, but otherwise the symptoms were the same as those produced by subcutaneous inoculation. The intra-peritoneal inoculations were as a rule more rapidly fatal. The less virulent cultures more often proved fatal when inoculated intra-peritoneally than when inoculated subcutaneously.

The introduction of fragments of the organs or of pure cultures into the stomach, either by mixing them with the food or through the stomach-tube, was usually fatal to mice, and almost always fatal to rats and to small young guinea-pigs and rabbits. The *post-mortem* appearances were, generally speaking, the same as those found after subcutaneous and intra-peritoneal inoculation. There was more swelling of the intestine, the intestinal follicles, and the mesenteric glands than in animals killed by subcutaneous inoculation; on the other hand, the external lymphatic glands were usually less swollen than in animals killed by subcutaneous or by intra-peritoneal inoculation.

In *post-mortem* examinations on animals, the inguinal and the cervical glands were nearly always found to be much more severely affected than the axillary glands.

The result of inoculation experiments was to show, as a general rule, that when the plague bacillus was cultivated for successive generations in artificial media it rapidly lost its virulence.

When rats were found dead in houses in which cases of plague had occurred, plague bacilli were often to be found in their lymphatic glands and other organs. These animals sometimes had well-developed buboes, most commonly in the inguinal region.

Mice, rats, guinea-pigs, and rabbits confined in the same cages with infected animals usually died of the disease.

A monkey, that chewed and sucked a piece of sugar-cane infected by a pure culture of the bacillus, died in five days of the disease. The *Post-mortem* examination showed very slight swelling of the inguinal glands, great congestion of the intestine, and swelling of the mesenteric glands and of the spleen.

A pig ate the spleen of a man that had died of plague; the animal lost flesh rapidly, suffered from diarrhoea, and died of plague in twenty-two days. The *post-mortem* examination showed hæmorrhages in the abdominal walls; the inguinal glands were swollen to the size of a hazel-nut and bluish-red in colour, the sub-maxillary glands were swollen to the size of a hazel-nut, the mesenteric glands were swollen to the size of a bean or a hazel-nut and of a bluish-red colour; there were hæmorrhages in the mesentery, with much congestion and swelling of the stomach and intestinal walls, hæmorrhages in the mucous membrane, and swelling of the intestinal follicles; the spleen was enlarged, the kidneys were swollen and congested, and the lungs engorged with blood. The plague bacillus was found in the interior of the organs, in the glands, and in the blood. Another pig, inoculated subcutaneously on the abdomen with a small fragment from a bubo, died of the plague in forty days. The appearances on *post-mortem* examination were substantially the same as those just described. The site of inoculation showed moderate congestion and swelling.

Two cats that ate portions of a bubo were ill for seven days and became very thin, but recovered.

Fowls that swallowed fragments of organs, and matter infected with pure cultures, died as a rule after three or four days. Plague bacilli were found in the blood and organs.

Pigeons were immune to subcutaneous inoculation.

Mice, guinea-pigs, and rabbits, when inoculated with cultures attenuated either by cultivation through several generations or by heat, were gradually rendered immune against inoculation with virulent cultures.

By successive inoculations from animal to animal with fragments of the organs or with blood, the virulence of the bacillus could be increased to a definite degree varying with the species of animal.

By microscopical and bacteriological researches bubonic plague is shown to be a disease in which the blood, the organs, the saliva, the urine, and the fæces of those that are affected with or have succumbed to the disease contains a specific bacillus, pure cultures of which, inoculated into various animals, produce in these animals the same disease.

IV.—DIAGNOSIS OF BUBONIC PLAGUE.

The diagnosis of the plague is based upon the clinical characteristics and upon the morbid appearances above described, and upon the demonstration of the presence of the plague bacillus.

In the dead body, if the processes of decomposition are not too far advanced, the existence of the plague can be proved with certainty by demonstrating the presence of the bacillus in the spleen, the buboes, or in other affected organs, either by microscopical examination, or in twenty-four to forty-eight hours by culture experiments. I have never seen a case of plague without glandular swellings.

In the countries in which the plague is generally met with, if bacteriological methods of diagnosis are not available, the disease is liable to confusion with pernicious malarial fevers, with malignant typhus of rapid course, with splenic fever, and with other varieties of adenitis. The cases in which mistakes may most readily arise are, on the one hand, those in which, with severe general symptoms, no external buboes make their appearance; and on the other hand those in which, with mild general symptoms, buboes appear, the true nature of which is not suspected. But in well-marked cases of plague, with pronounced general symptoms and well-developed buboes, there can, even in the absence of bacteriological investigation, be little difficulty in diagnosis.

As already stated, plague can usually, in severe cases at any rate, be recognised by the examination of the blood. For this purpose, one of the finger-tips or a portion of the skin of the body must be carefully cleansed with soap and water, 1% sublimate solution, alcohol and ether, and pricked with a needle sterilised by heat. For direct microscopical examination the blood should be received on a cover-glass; for cultivation, on a tube of agar or of alkaline gelatin-peptone solution. In stained preparations of blood, the bacilli are usually found in very small numbers only, two or three in a field or even in the whole preparation. In the agar tubes or in the peptone solution, in 24 to 48 hours, the bacilli grow in the manner already described. As before said, *staphylococcus pyogenes aureus* is frequently found in addition to the plague bacillus-

If the bacillus cannot be detected at the first attempt, the blood must be examined day after day, and in this manner the organism will often eventually be discovered.

If the examination of the blood gives negative results, the urine, which nearly always contains albumen and plague bacilli, should then be examined. Cleanse the neighbourhood of the urinary meatus with sublimate solution, and while the patient is urinating suck up some of the urine with a sterilised pipette. The urine should then be examined in hanging-drops and in stained preparations; and with a few drops (about five) plate cultivations should be made. In hanging-drops the bacilli can usually be seen at once, sometimes in chains of three or four links. Stained preparations generally give the same results. On the agar-plates, after twenty-four hours, colonies of plague bacilli make their appearance; these are small, white or greyish-white, with a bluish sheen by reflected light, and with iridescent borders. In addition to the plague bacilli, pus cocci are sometimes found; these are readily distinguished by their greater luxuriance of growth and by other peculiarities. For confirmation, cultures from the colonies should always be made on agar (coagulated with the tubes oblique), on bouillon, and on gelatine; inoculation of mice, rats, and guinea-pigs should also be undertaken. If no urine is passed, an attempt may be made, in case of need, to draw some off by the catheter.

The blood drawn by puncture from the buboes and from the other glandular swellings always shows the bacillus on microscopical examination and on cultivation.

By these methods the diagnosis of plague can almost always be made with certainty, alike in severe cases with or without buboes, and in milder cases.

The presence of the bacillus in the vomit, the feces, and the saliva, can often be detected in the following manner. First make plate cultures, and from these make cultures on alkaline gelatin-peptone solution. In the latter, the bacillus grows along the bottom and the sides of the tubes. After twenty-four hours, these cultures should be examined microscopically, and fresh cultures should be made. For this purpose material from the bottom and the sides of the tubes should be taken. Often in the primary cultures, and almost always in the secondary cultures, the bacilli are to be found.

Pus from the buboes, examined microscopically and by cultivation experiments, was found in most cases to contain plague bacilli in small numbers; in addition sometimes bacterium coli, and usually staphylococci. In some cases, microscopical and bacteriological examination, the pus from the buboes proved perfectly sterile.

The necrotic glandular masses in the interior of the buboes, examined by the microscope and by culture experiments, were found always to contain bacilli.

If all the methods of research here described give a negative result, the conclusion may be drawn, with considerable confidence, that the case is not one of plague, or that the disease has entirely passed away.

Plague bacilli were found in the blood of two patients ten days after the end of the first stage of acute fever, in the urine of various patients with and without buboes four to six weeks after the fever and in the feces and the saliva five days after the fever. In blood obtained by puncture of the connective tissue of bubonic swellings, plague bacilli could sometimes be detected four to six weeks after the onset of the disease, and in one case even at the end of ten weeks. Frequently the bacilli found at this late period had nearly or completely lost their virulence.

(To be continued.)

A Mirror of Hospital Practice.

URTICARIA.

BY W. D. SUTHERLAND, M. B., Sambalpur, C. P.

THE following cases which I have recently met with may be of interest as exemplifying three causes of urticaria:—

1. A Hindu who, as far as he was aware, had never been in a guinea-worm district, complained of violent urticaria all over the body. The weals were very well-marked, and came out in successive crops, each crop persisting for about 12 hours, with intense itching. The duration of the disease was three days, and in this case one was led to suspect *guinea-worm* as the cause (Duke) from the presence of some pain and slight swelling just above the right external malleolus. After the eruption had disappeared, this swelling became greater, and at last the characteristic bleb formed, followed by the extrusion of the parasite.

2. A European—he had eaten a couple of mangoes, the first of the season, and in about two hours presented the following appearance:—

The face was much flushed, with some oedema over the cheek bones. Both eyes were nearly closed from oedema of the eyelids. The conjunctiva of the right eye was intensely congested; that of the left eye was only slightly redder than normal.

The front of the chest was intensely red, but no oedema was visible.

The anterior aspect of both thighs, and of the knees was flushed.

In the hands and feet the patient complained of a sharp tingling: but there was no objective symptoms. Temp. 100°. Here emesis was induced by a dose of mustard and hot water, and the symptoms rapidly subsided. The oedema of the eyelids, however, persisting for some 6 hours.

Next morning no trace of the skin affection was visible. In this case *peaches* brought on a similar attack some years ago.

3. A Eurasian of fair skin: here exhibition of *quinine* even in gr. doses is followed by painful swelling of the hands and wrists with flushing of the face and chest, on the chest weals are seen, their size and number being apparently dependent on the amount of the drug ingested. The patient can always tell when quinine is given, as it never fails to produce these symptoms, within from 2 to 3 hours after it is swallowed.

CASES OF CONGENITAL DEFORMITY.

By D. G. CRAWFORD, M.B., SURGEON-MAJOR, I.M.S.,
Civil-Surgeon, Monghyr.

THE following cases of congenital deformity have come under my notice during the past six months: the first two when on tour inspecting vaccination and dispensaries, the third on coming to the Monghyr dispensary for treatment of cataract.

Case 1. Bauna Kundu, Hindu male, two years old, child of Puran Kundu. The father is about 30, the mother about 25, both are in good health. They have had three other children, none of which showed any deformity; and no other deformity is known in the family. Bauna presents the following deformities:—*Right leg:* Femur, tibia, and fibula are each about two inches long; the os calcis is prominent, there are three bones in the metatarsus, the great toe is normal, the 2nd and 3rd toes are missing: The 4th and 5th toes are present, but webbed together up to the nail. *Left leg:* The femur is normal, but there is apparently only one bone in the leg, below the knee, about two inches long. No tarsal bones can be felt. There is only one metatarsal bone, which ends in a normal great toe. Growing from the outer side of the great toe there is another toe, without bones or nail. *Right arm:* There is only one finger, which grows from the outer side of the wrist, in the position of the thumb, it has a metacarpal bone and two phalanges, but in appearance resembles a finger much more than a thumb. *Left arm and hand:* Normal.

At Khargpur village, Khargpur Thana, brought for inspection of vaccination, on 4th February 1897:

Case 2. At Jallalabad village, Khargpur thana, brought a small brother for vaccination inspection on 12th March 1897. A Musalman male 12 years old, with no less than eight toes on the left foot, attached to seven metacarpal bones. The 2nd, 3rd and 4th toes appeared to be supernumerary, the 4th was "riding" between the 3rd and 5th. The great toe was normal, the others appeared to be the 2nd, 3rd, 4th (riding), 2nd, 3rd, 4th and 5th. The right foot was normal, and had only five toes. I intended to examine this case more carefully after finishing

my vaccination inspection, but when I was ready found the boy had gone.

Case 3. Musahib, Musalman male, 55, came to Monghyr dispensary for operation for double cataract on 25th May 1897. He has six toes on each foot, the 5th being supernumerary, and attached to the same metatarsal bone as the 6th. His father, mother, brothers, sisters and children are all said to have normal feet.

A CASE OF CHANCRE OF THE EYELID.

By ASST.-SURGN. MONOMOYUN GUPTA, L.M.S.,
House-Surgeon, Eye Infirmary, Medical College Hospital.

ADHAR CHANDRA GOSWAMI, a Hindu male, aged about 32 years, came to the Eye Infirmary, Medical College Hospital, on the 3rd January 1897, complaining of pain and redness in the right eye.

Previous history.—The history which could be gathered from him was interesting. About 10 days ago, a member of his family had phimosis with chancres; he used to dress him daily. One day, while he was accompanying him to the hospital, he had to dress his friend's sores in the way; while engaged in dressing inside the carriage, some dust went inside his eye and he instantly rubbed his eye with his right hand. About three days after this he noticed some pain and redness about the outer corner and lower lid of the right eye.

Present condition.—On the outside of the lower conjunctival sac, and close to the margin of the lower lid of the right eye, was an ulcer about the size of a split pea. The margin of the ulcer was clean cut with a good deal of induration about its base. The floor was excavated and was covered with some scanty greyish secretion. The whole of the lower lid was swollen and indurated. Both the palpebral and ocular portion of the conjunctiva around the ulcer was injected. The lymphatic glands in front of the right ear were swollen. The patient complained of dull aching pain in the eye. Discharge was very scanty.

Treatment.—Lotio hydrarg perchlor (1 to 4000) was ordered to be dropped into the eye every four hours for the purpose of washing the ulcer, and iodoform vaseline (5i to 5i) for application inside the eye. On the outer surface of the indurated lid ungt. hydrarg oleat (5i to 5i) was rubbed night and morning.

In about 15 days the ulcer got completely cured, but some induration was left behind, for which ungt. hydrarg oleat was continued, and internally mist. hydrarg iodid 5i t. d. s. was prescribed. The man got all right in a month's time.

Remarks.—In this case the mode of infection could be clearly traced—obviously, the man rubbed his eye with his dirty fingers and soon after the ulcer appeared. The ulcer yielded readily to antisyphilitic treatment.

THE STANDARD.

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Indian Medical Gazette.

JULY, 1897.

PLAGUE PRECAUTIONS IN BENGAL.

WHATEVER delinquency may have been shown by the authorities in other parts of India in the matter of taking precautions against the introduction and spread of plague, it cannot be laid to the charge of the Government of Bengal that the steps so far taken have been wanting in any respect whatever. It is highly satisfactory to observe, despite the fact that the plague is dying out in Bombay and other infected places, that the examination of passengers by rail is still being carefully carried out at Khana Junction and elsewhere, and in such an orderly and respectful manner as can give no offence whatever to any reasonably minded person, and, to say the least, complaints, which have been made, have been of a very trivial description.

The chances of the disease being imported by river are not lost sight of; ships arriving from infected ports and those departing from Calcutta for ports outside British India are subjected to a thorough sanitary overhauling, and in order that the mercantile community may not suffer loss by the undue detention of ships owing to these special precautionary measures, two additional Port Health Officers have been appointed, and the Collector of Customs has been authorised to grant port clearance under section 66 of the Sea Customs Act, on a guarantee being given by the agents of a vessel that, within 48 hours of departure, they will produce a duplicate copy of the Bill of Health as finally granted signed by the Port Health Officer or an additional Port Health Officer, and that if for any reason the Health Officer should refuse to grant the

Bill of Health, they will bring the vessel back to her moorings.

It is especially interesting and commendable to know, although the *Pekin* left Jeddah on 28th of May 14 days or so before plague was reported there, that the returning pilgrims were carefully examined at Bombay and declared free of infection; and that should, after a further sea-voyage of ten days, the period of incubation of plague as adopted by the recent conference at Venice, they were again thoroughly examined at Diamond Harbour. The arrangements made for the disinfection of the clothing of the pilgrims, the crew, and the steamer itself, and for segregation and isolation, which, we are glad to say, were unnecessary, as there was no sickness on board, should go far to relieve the minds of the commercial community and the general public. We may add further that, in order to reduce the risk to a minimum, the passengers were despatched by rail from Diamond Harbour to their homes direct.

In the City of Calcutta itself the Health Department has been on the alert ever since plague broke out in Bombay. Medical Inspectors have been, and are still, engaged in house to house visitation, especially in lodging and other large and crowded tenanted houses, in order that suspicious cases if discovered may be isolated *at once*, and the infected area thoroughly cleansed and disinfected, which is the first, most important and most effective measure in dealing with epidemic diseases. The special cleansing staff was disbanded early in the current month, but we trust the Commissioners are fully alive to the importance of increasing their permanent staff of menials to such an extent as will maintain the city in a better state of cleanliness. In the matter of accommodation for isolation and segregation, attendance of the sick, disinfection, water supply, and the disposal of the dead, every possible precaution has been taken. Only those who have been responsible for making the arrangements for dealing with plague in such a large and commercially important city as Calcutta or for such an enormous province as Bengal, can tell how onerous the task has been.

In all these precautionary measures nothing has been left undone to secure that the religious feelings of the native public, whether Hindu or Mahomedan, will not be wounded; and it is highly satisfactory to know that all classes are beginning to realise that whatever action is

taken, is in their own interests and the interests of the general public. It is to be hoped that, if such a dreadful calamity as the outbreak of a plague epidemic should ever befall Calcutta, all classes of the community will consider it their bounden duty to have their friends and relatives isolated at once, placed under treatment, and assist, by every means in their power, officers specially qualified to take the steps necessary to check the dissemination of the disease. By doing so the lives of thousands of their fellow-creatures may be saved.

I. M. S. DINNER IN LONDON.

A CORRESPONDENT sends us the following interesting communication on the subject:—The first annual dinner of the Indian Medical Service in England took place on May 20th at the Café Monico, London, and was, in most respects, a great success. The combined prevalence of plague and famine in India, by stopping the furlough of most, accounted for the comparatively small number of men on the active list that were able to avail themselves of the opportunity. Seventy-six members of the Indian Medical Service were present, and of this number no less than 45 were on the retired list. It is gratifying to observe the great interest which these latter take in the Service and its prospects, for many attended at some inconvenience: some coming from the extreme north of Scotland, others from Ireland, &c., and coming for the occasion only, out of pure *camaraderie*; and it was a pleasure, and indeed an encouragement, to such, as are still in the Service, to observe the ruddy hue of health on the faces of almost all of the retired, many of whom were old veterans that had distinguished themselves in the Mutiny; others had been well-known administrators, while some few had served all humanity, by advancing the science and practice of surgery and medicine, &c. The Service had the honour of entertaining the following guests:—Lord Geo. Hamilton, Secretary of State for India; Sir Wm. MacCormac, President of the Royal College of Surgeons; Sir J. Dick, Director-General of the Navy; Surgeon-General Jameson, Director-General of the Medical Staff; Mr. Ritchie, Dr. Dickinson, Mr. Reg. Harrison and Mr. Sprigge. To the regret of all Lord Lister was prevented by a previous engagement from attending, while

Mr. Dawson Williams, of the *British Medical Journal*, we were sorry to learn, was prevented by illness from coming.

The dinner was organised by an influential committee in London, and they had the great advantage of securing, as its Secretary, the services of Mr. Freyer, who, all his brother officers will be glad to know, is successfully carrying on in London the branch of surgery which he advanced and practised with such distinction in India. Sir Joseph Fayrer presided on the occasion, and discharged his duties in a manner that seemed to give satisfaction to all. As President he proposed, in separate toasts, the healths of the Queen-Empress and of the Prince of Wales and other members of the Royal Family, introducing each toast by a few remarks testifying to the good work of the Queen and various members of the Royal Family, and to the feelings of gratitude and loyalty with which they were recognised: this seemed especially appropriate this year, and to voice the feelings of all present.

The next toast of the evening was "The Indian Medical Service," which was proposed in suitable terms by Sir William MacCormac, President of the Royal College of Surgeons, and was responded to by Sir Joseph Fayrer, who both acknowledged the recognition accorded to the Service by the eminent proposer of the toast, and was also able to supplement, from his intimate knowledge and long service, the references of the previous speaker, and as this was an inaugural dinner it was quite befitting, not only to sketch out the good and important assistance which the Service has rendered to the State in developing and consolidating the Indian Empire, but also to dwell with pardonable pride on the early beginning and traditions generally of the Service, which all tried to foster *esprit de corps*, and to encourage and maintain the prosperity of the Service. He referred to the important part which had been played in the early days of the Company by Broughton and Hamilton; in recognition of their professional services to native potentates, the one had obtained concessions of territory for his Company, forming another important starting point, from which British rule rapidly extended over Bengal; while the other, by popularising the advance of the British sway did much to smooth over difficult and delicate negotiations, which led to important results. The speaker then went on to show how much the Service had done, in times well within the

memory of all, not only in advancing surgery and medicine, but in starting and developing other departments which are now important factors in the Government of India. In this connection special stress was laid on the important part which Dr. O'Shaughnessy and his experiments had played in starting the Telegraph Department in India. The speaker further enumerated the names of many who had distinguished themselves in the most various directions, but space forbids my giving further details. I will only add that Sir Joseph Fayrer expressed surprise that somebody had not written a book on the Indian Medical Service; and in these days, when books are written on such very small provocation, it is indeed a wonder that some historian has not arisen to put together the chronicles of a Service whose origin and development are so intimately interwoven with that of the spread and establishment of British influence over India; the material at hand is ample for such a work, which would be interesting, not only to members of the Service, but to all that are interested in India. The next toast was the "Sister Services," which was done justice to, and at the last moment, by Surgeon-General Rice, who referred to both in appropriate terms. Sir J. Dick responded for the Navy, expressing pleasure at the references made to it, and in an amusing way sketching and exemplifying various developments and advances that had occurred in the Navy. Surgeon-General Jameson then responded for the Medical Staff, and after stating that what advanced the interests of his own branch of the Service also advanced those of the Indian Medical Service, proceeded to enumerate certain disabilities under which the medical staff laboured, explaining that some had been removed, and that others were under consideration, and adding that the War Office were most anxious to do all in their power to advance the interests of the Service.

The health of the guests was next gracefully proposed by the President, Sir Joseph Fayrer, who referred to all in detail, giving special prominence to the guest of the evening, Lord Geo. Hamilton, who, as Secretary of State for India, had, for several months past, been grappling with three most important evils that were affecting the health and prosperity of India, *viz.*, (1) famine; (2) plague; (3) the injurious effects produced on the health of the army by the increased prevalence of venereal disease. He referred to the

successful way in which the first two were being confronted, and confidently anticipated that success would attend the proposed legislation for mitigating the third evil.

In replying for the guests, Lord Geo. Hamilton spoke to the following effect:—He acknowledged, on behalf of all the guests, the great pleasure it had given them to take part in so interesting an occasion as the inaugural dinner of a series of annual dinners to be held by a service which had always done such important work, and he added for himself that he had been very pleased at being able to attend. His Lordship said that everything had conspired to make the occasion a success: the dinner had been excellent, and they had listened to some most interesting speeches; for his own part increasing knowledge and experience had always rendered him somewhat sceptical about "traditions," but he had great pleasure in acknowledging that officers of the Indian Medical Service had generally acquitted themselves with credit in the discharge of the very varied duties that had fallen to their hands—duties that were often quite outside the scope of their profession; but he specially recognised and did justice to the work that had been done by the Service in advancing science, and in its capacity as a medical service, commenting on its humanising effects, and the assistance that it had rendered in developing and consolidating the Indian Empire; in illustration of which he stated that he had been informed on good authority that the dispensary on the Gilgit frontier had done signal service in reconciling the inhabitants to the new order of things, and that, in exercising generally a tranquillising effect on the border, it was at least equal to another battalion of troops; and he further added that the statement in the last annual report that 19 millions of people had received relief from the dispensaries throughout India, was some measure of the benefits conferred on the people of India by the Indian Medical Service. He then went on to say that the President had referred to three great evils which had engrossed his attention for several months, *viz.*, famine, plague and the disastrous effects of certain diseases on the health of the army. With regard to the first, he said that the Indian Medical Service had considerably contributed to the difficulties of the Government of India by so improving the sanitary

condition of India that the population had increased in ten years by 50 millions, or by rather more than the population of the United Kingdom! (Laughter.) With regard to plague, he gladly recognised the great services which had been rendered to the Government of India by the Indian Medical Service, and rendered so promptly and with such willingness on all sides; an instance of which had come to his notice the other day, in the case of an officer on leave, who had just been married, and who, on learning that his services might be required in connection with the plague, had immediately without demur left his bride, promptly responding to the call of duty. It is difficult, he added, to over-estimate the success of the medical profession, in assisting to check the spread of that plague, and in their endeavour to elucidate the mysteries that lie at its root; and in this task the doctors of other nations were also contributing: he had been amused to hear that French and German *savants* were renewing their struggles with great zeal, not over Alsace and Lorraine, but in Bombay, where they were wrangling over opposite views in connection with the bacillus of plague. With regard to the third point, *viz.*, the effect of certain diseases on the health of the army in India, he was glad that a marked change in public opinion had enabled them to re-examine this most difficult and delicate question under more favourable circumstances, and he trusted that the evil would be mitigated by the measures that are at present under consideration. He fully recognised the great importance of the subject from every point of view, and that our very dominion in India must depend on the efficiency of our army, and he anticipated much from the judicious co-operation of all in diminishing this great evil. In conclusion, His Lordship reiterated the great interest he took in such an important Service, which he felt sure would in the future continue to maintain its prosperity and traditions.

The health of the President was then proposed by Surgeon-General Cunningham, who referred to various points in his distinguished career; and after a few words of acknowledgment from Sir Joseph Fayrer, the party soon broke up, all agreeing that the dinner had been a great success.

This annual gathering of the Service may be useful for other than mere convivial purposes; and it is to the interest of the Service that

some organisation for these annual meetings be definitely fixed on, so that their success may not be endangered by the chapter of accidents. To bring the committee more in touch with the Service, it would be expedient to appoint a Standing Committee composed of influential retired members, whose number should be added to, by selecting year by year from amongst those that are on furlough, a certain number to sit on this committee.

LIST OF MEDICAL OFFICERS AND GUESTS PRESENT AT THE I. M. S. DINNER:

Fayrer, J.*
Lawrence, T.*
Rice, W. R.*
Harper, W. R.*
Ewart, J.*
Robertson, G.
Holmes, A. K.
Freyer, P. J.*
Keegan, D.*
Costello.*
Bate.
Heffernan, J.*
Sutherland, G. S.*
Morewood.
Lyon.*
Cayley, H.*
Alcock.
Cunningham, J. F.
O'Dwyer, M.
Roberts.*
Riddell.*
Earle.
Harris.*
McLeod.*
Pilgrim.
Baker.
Drake-Brockman.*
Halbert.
Richardson.*
Cunningham, J. M.*
Bower.
Playfair.*
Keith.*
Farquhar.*
DeRenzy.*
Sutherland, P. W.*
Williams, A. H.
Smith-Prowning.
Smith-Wynne.*
Penny.*
Young.
Quicke.
Pemberton.

Cameron, C.*
Davidson, S. M.*
Moore, H. M.
MacRury.*
Porter, A.*
Wimberley, C. N. C.
Aitelson, J. E. T.*
Johnson, E. R.*
Reid, J.*
Faulkner, A.*
Sully, J.
Niven, W.*
Brown, J. E. B.*
Eyre, M. S.
Cates, W.*
Raddock, C. E.*
Massy, G.*
Serivon, J. B.*
McKellar, E.*
Canter, F.
Bellew, P. F.*
Mackenzie, J. F.
Baker, J.*
Skardon, T.*
Warlicker.
Buchanan, A.
Meyer, C. H. L.
Kilkelly, C.*
Rodgers, J. W.
Hare, E. Wickham.
Colvin, Smith.*
Payne, E. S. F.
Griffith, G.*

Guests:—

Lord G. Hamilton.
Sir Wm. MacCormac.
Sir J. Dick.
Surgn.-Genl. Jameson.
Ritchie, Mr. R.
Dickinson, Dr.
Harrison, Reg.
Sprigge, S.
Dawson, William.

* Retired.

WHAT SHOULD MIDWIVES BE TAUGHT?

DR. G. ERNEST HERMAN contributes a paper in the May number of the *Practitioner* on what ought midwives to be taught? The paper is the outcome of the recent agitation concerning the examination and registration of midwives. It has been urged that the advantage of being registered would lead midwives to think they know more than they do, and in consequence to overstep the proper limit of their duties. Dr. Herman thinks "that the more exactly and thoroughly the midwife knows her own duties, the more clearly will she draw the line between her

own functions and those of a medical man, and the less likely will she be to place her patients in danger by over-stepping the limits within which her knowledge makes her competent to act."

Dr. Herman then considers what a midwife is, and how much of the science and art of midwifery she ought to know. A midwife is a woman who is competent to attend a natural labour. She differs from the monthly nurse in that she so far understands the process of labour and child-bed, that she knows how things ought to go and can tell when anything is wrong. She differs from a doctor in that she is not competent to perform grave operation or to judge how complications of labour and lying-in ought to be treated.

The minimum of knowledge that a midwife ought to possess is given below in the form of a syllabus thus:—

1. "A thorough understanding of what is meant by sepsis, asepsis and antisepsis, and an accurate knowledge of antiseptic agents, and how to use them *"to prevent puerperal fever a preventible disease."*

2. (a) Enough of the structure of the placenta to know why the placental site may bleed profusely; (b) a clear conception of the normal mode of delivery of the placenta so as not to ignorantly interfere with the natural process; (c) causes of bleeding from the placental site and the ways of promptly controlling hæmorrhage pending the arrival of a medical man.

3. How to ascertain the position of the child at the beginning of labour, which implies proficiency in the abdominal palpation of the pregnant uterus so as to correct malpresentation.

4. Natural shape and measurements of the pelvis, so as to send for a doctor early, if pelvic contraction is recognised (it is not her business to understand the different forms of pelvic contraction, but she ought to be able to perceive that the pelvis is of a wrong shape or too small or that the child is not entering the pelvis as it ought to do.)

5. Mechanism of labour, conditions upon which the position of the fœtus *in utero* depends, forces which dilate the parturient canal and expel the child, the directions in which the fœtus ought to move, the reasons for its movement in one direction rather than another, and the significant departure from the natural process.

6. The physiological process by which the cord is thrown off and respiration established.

How ophthalmia neonatorum is caused. How to distinguish a child born dead from one still-born, and how to establish respiration when a child is still-born. How a baby ought to be fed, clothed, and kept in health.

7. A broad outline of the changes that take place in the maternal organism during the lying-in period."

Dr. Herman's paper is of much interest. The adoption of the above syllabus for a course of instruction to midwives in lying-in institutions, where diplomas to midwives are granted, would be of advantage, and it is to be hoped that those in authority will always endeavour to impress upon midwives their proper status.

Medical News.

THE CHAIR OF CLINICAL AND MILITARY MEDICINE IN THE ARMY MEDICAL SCHOOL, NETLEY.

It is with much pleasure we announce the appointment of Brigade-Surgeon-Lieutenant Colonel McLeod, M.D., LL.D., to the chair of clinical and military medicine in the Army Medical School at Netley, in succession to Dr. Cayley, whose term of office expires on the 31st of July. Dr. McLeod's many friends will be pleased to hear of his success. The appointment is for 7 years. The position, work and pay are all satisfactory. The authorities, in choosing Dr. Kenneth McLeod for the appointment, are to be congratulated on having selected a man of merit and distinction, and one who will ably maintain the high standard of teaching at the Netley School.

JUBILEE HONOURS TO MEDICAL MEN IN INDIA.

WE congratulate Surgeon-Major-General Cleg-horn, C.S.I., and Professor Haffkine, C.I.E., on the honours which Government has awarded them on the occasion of the 60th Anniversary of the Queen-Empress' reign. We should like to have seen the name of the head of the Indian Medical Service in the list of the Knight Commanders. When honours have been distributed with so lavish a hand it might have been expected that the Director-General of so important a service would have received an honour more commensurate with the dignity of his office. No other honours, with the exception of some unimportant native titles, have been conferred on the medical profession in India, an omission which is all the more remarkable in a year which is essentially a medical year owing to plague and famine. Medical officers have had

their leave stopped, have borne the heat and burden of the day uncomplainingly, and when the time for reward has arrived have all but been forgotten.

RINDERPEST.

WE notice a letter addressed to the Indian *Lancet* by Veterinary-Major Mills, giving an interesting description of Dr. Koch's 1st report on his rinderpest experiments in Africa. It appears "that Dr. Koch was led to examine the bile of diseased animals in consequence of the belief of the Free State farmers that the bile taken from an animal that died from rinderpest and mixed with blood or other liquids was considered to be a cure for the disease. The bile in pure cultivations was examined by Dr. Koch and he found it to contain a bacterium analogous to that discovered by Dr. Simpson of Calcutta, who declared it to be the cause of rinderpest. Experiments conducted with bile had here negative results, and as Dr. Koch says "we are consequently justified in saying that the bile does not contain the contagion of rinderpest."

On the other hand further experiments showed that the bile of cattle dead from rinderpest injected under the skin in doses of 10 c. c. was sufficient to render healthy cattle immune. This immunity sets in on the 10th day at latest, and even four weeks afterwards an injection of 40 c. c. of rinderpest blood produced no untoward results. The process in Dr. Koch's opinion is of an active nature. It thus appears that Dr. Koch finds a microbe in the bile of animals suffering from rinderpest; that he can produce immunity from the disease by injecting this bile under the skin of healthy animals, which does not act immediately but requires time to develop; that he considers the immunity to be an active one, that is, caused by a living organism, and yet he concludes that the bile does not contain the contagion of rinderpest. If these statements are correct, it is difficult to understand exactly Dr. Koch's views on this subject, and how he can account for a fluid producing an active immunity without the agency of a living organism. Of course, it is possible that Dr. Koch, not being satisfied with the results of his experiments with this microbe, may think that there is another undiscovered organism in the bile producing active immunity. There is this fact, however, to be borne in mind against any other hypothetical microbe that, as may be seen by reference to the *British Medical Journal* of May 9th, 1896, the disease has been produced by the action on healthy animals of pure cultures of the microbe found by Dr. Simpson in the several organs of rinderpest animals.

QUARANTINE ON THE DAMAN FRONTIER.

It is recently reported that of the 49 people in quarantine, the majority are of the Gola caste, the rest being Mahomedans, among which latter

community the plague has been very rife recently in Daman. A very curious feature in connection with these people is that out of the 49 twenty are suffering from glandular swellings, of which three are regarded as suspicious cases.

OFFICIAL PAPER.

INDIAN PRINCES' VICTORIA HEALTH INSTITUTE.

From the SECRETARY to the Government of India, Foreign Department—To His Highness the MAHARAJA RANA of Dholpore.—Dated Simla, the 20th June, 1897.

YOUR HIGHNESS,—The Governor-General in Council has given most careful consideration to the scheme which your Highness explained to me, in your interview for the commemoration by the Ruling Princes and Chiefs of India of the Jubilee of the reign of Her Majesty the Queen-Empress.

2. The Government of India have received, with warm satisfaction, the assurance that the Princes and Chiefs of this country welcome the present opportunity of testifying their love and reverence for Her Majesty the Queen-Empress of India. The Government of India also fully endorse the opinion expressed by you, on behalf of the Ruling Princes and Chiefs, that no presentation of gifts to herself, however splendid, would be so grateful to Her Majesty as the inauguration of the scheme you foreshadowed, which by bringing the resources of modern science to bear upon the diseases which especially afflict India, may do so much to save human life and diminish human suffering, and which will confer lasting benefits on all the inhabitants, whether poor or rich, of this great Empire.

3. Your proposal of an "Indian Princes' Victoria Health Institute" seems well calculated to attain those ends, and there could be no more fitting commemoration of Her Majesty's long and beneficent reign. Every year there is an appalling mortality from malarial fever, and from cholera, typhoid fever, and other zymotic diseases. Snake-bite and rabies also add to the annual death-roll. During the present year there has been a visitation of bubonic plague which, in addition to destroying many thousand lives, gravely imperilled the foreign commerce of India, on which the prosperity of the country so largely depends.

4. The best hope of combating these diseases, which are a cause of so much suffering and loss of life, appears to lie in the development of bacteriological and cognate researches under scientific medical guidance, and carried on with due regard to medical requirements and the interests of humanity.

5. The Government of India approve the general outline of your scheme, which is, that the property of the Institute should be vested in a governing body, consisting of six representatives of Ruling Chiefs and three nominees

of the Government of India. But there are certain important, though subordinate, matters which the Government of India must reserve for consideration before they can give their approval to any detailed scheme.

6. For example, there is the question of site. On the one hand, it would be appropriate that the Institute should be in State territory; on the other hand, it is important that it should be easily accessible to as large a part of India as possible.

7. Then, again, the scientific work of the Institute must necessarily be subordinate to medical science as a whole. It is, therefore, important that the technical work of the Institute should be directed under the best medical advice obtainable in India. Probably this could be effected by putting the purely technical work under a small Committee chosen, subject to the approval of the Government of India, with a view to the scientific attainments of the members. At any rate the practical work of the Institute, and the appointment of experts to conduct it, must be subject to regulations sanctioned by the Government of India.

8. Finally, I must point out to your Highness that the approval of the Government of India to your scheme, excellent and enlightened though it be, must be subject to the condition that sufficient funds can be raised to bring it into effectual operation.

NON-VENEREAL BUBO.

THE *British Medical Journal* of June 12th gives an interesting note by Fleet Surgeon C. C. Godding of H.M.S. *Centurion*, Hongkong, on non-venereal bubo. It is as follows:—

"Since my paper on Non-Venereal Bubo appeared in the *British Medical Journal* of September 26th, 1896, three communications have been made relating to this disease, two from army medical officers—one suggesting a purely venereal origin, the other boils, dhobi itch, malaria and septic infection from intestines; finally, Dr. Cantlie's account of these idiopathic buboes, given at the Epidemiological Society, December 16th, and published in the *British Medical Journal*, January 9th, 1897, connecting them with plague, and classifying them as pestis minor. I should like to deal as briefly as possible with each of these propositions, and to state explicitly that my remarks apply only to non-venereal bubo.

"It is an old idea that the prevalence of these bubo cases in the army is due to venereal disease, but, in order to show reason for my conviction that venereal disease is not a cause, I have investigated the personal histories of 13 men in this ship who suffered from the disease during the past year (1896), with these results: In 4 young men there was no venereal history whatever; in 1 senior petty officer certainly none for

many years; in 5 there had been no venereal history for about eighteen months; 1 had a doubtful history before joining the service, and in 2 only was there any considerable venereal history. The cases with venereal history do not last longer, and the results of treatment also discountenance the venereal idea; mercury and potassium iodide are absolutely harmful, as I found out many years ago, these drugs increasing the general cachexia and tendency of the bubo to suppurate. All cases of bubo associated with venereal disease are invariably so classified.

"Malaria, dhobi, boils and sepsis from intestines are causes suggested by Surgeon-Major B.M. Skinner, A.M.S.* I do not consider malaria to be a common cause, and my opinion is fixed because I have found quinine useless, have practically abandoned it, and, as stated in my paper, only give it in those cases in which there are definite indications for its use. My recent cases also are men who have mostly been with me in this ship for the last three years and who have shown no signs of malarial poisoning. Sympathetic bubo associated with boils, dhobi, etc., would be returned nosologically under their respective headings; but admitting these as immediate causes of origin, they do not account for the long train of constitutional symptoms which mark this disease. The suggestion of septic poisoning from the intestine is very plausible, but in none of my cases has there been dysentery or symptoms of ulceration of the bowel, and I imagine the treatment (free use of arsenic) would very soon have given prominence to such conditions.

"As to pestis minor, Dr. Cantlie's account of these idiopathic buboes corresponds very closely to my own, especially the symptoms of fever, anæmia and boggiess of the bubo towards the twentieth day. The possible connection of non-venereal bubo with plague has certainly never before occurred to me; doubtless many abortive cases of plague occur during an epidemic (and the same may be said of other epidemic diseases) when from some personal idiosyncrasy the individual is partially protected, and these abortive cases may have given rise to the idea; and had non-venereal bubo been unknown till after the plague epidemic, there would have been still more substantial grounds for the association, but non-venereal or sympathetic bubo is a disease which has long existed, and has a distinct nosological heading.

"Finally, I have seen these cases for the last twenty years, in various places, the worst on the East African Coast, when there was no suspicion of plague, and for many years past the *Health of the Navy* shows a fairly constant number of these cases, so I fail to draw any connection between the two diseases.

* *British Medical Journal*, January 9th, 1897.

"In the absence of any account of this disease, the treatment is necessarily an outcome of personal experience. I deprecate surgical interference for two reasons: (1) Because they are operations on patients already suffering from a disease marked by anæmia and weakness, and consequently (2) the wounds often take a long time to heal, and the resulting scars are sometimes truly formidable and liable to break down. See Case III in my paper.

"I think excision of inguinal glands has become rather a matter of routine, and is sometimes undertaken without due regard to the value of the glands. On the other hand, believing as I do that this is a constitutional disease, it would be very illogical on my part to expect to cure it by excising these enlarged glands, which are only a local symptom. This is a distinct disease, has long existed, and though there are some intractable cases requiring operation, yet the disease can mostly be cured by constitutional treatment. I have received a gratifying account of a case in H. M. S. *Redpole* at Hankow from Surgeon M. J. Rodd, and there are now many recovered men in this ship with sound groins and useful glands to support the statement. I now regard arsenic almost as specific in these cases as quinine in malaria."

LONDON LETTER.

LONDON is going distracted over the Queen's Diamond Jubilee. The route by which the procession is to proceed is being built up on each side by a succession of scaffoldings and stagings which are at present supremely ugly, but will, no doubt, when draped with scarlet, decorated with flags and loaded with well-dressed people, present a very splendid spectacle. The prices that are being charged for seats, windows and rooms are enormous. St. George's Hospital, which commands a very favourable view of the procession, erected several blocks and tiers of seats, the best of which were promptly let for 20 guineas apiece. The profits of this transaction go to the support of the charity. Other hospitals and churches on the line of route have gone in for a similar means of replenishing their coffers. This is quite legitimate and consistent with the general spirit of philanthropy and charity which, at the suggestion of the august personage in whose honour the celebration takes place, underlies all commemorative schemes. But an immense amount of speculation is being carried on and extensive attempts to turn the exuberant loyalty of the nation and capital city to private profit. Syndicates and bureaux have been started which have purchased spaces and houses for erecting stands, houses have been bought for conversion into seeing places on condition of demolition and re-erection,—persons who are fortunate enough to have houses or shops on the line of procession have made handsome sums by

the letting of balconies and windows and roofs. There will be a rare scramble for money all round. Hotels and lodging-houses are demanding absurd rents for rooms. Carriages of every description will be let at a huge premium, and prices will for the time go up all round. It is a splendid opportunity for the labourer, the artisan and the tradesman. The railway companies are advertising excursions at ridiculously low rates to and from London, and the 22nd of June will be a very memorable day in the annals of London, and indeed in British history. The occasion will not be devoid of risk to life. There will be, according to all anticipation, a dense, eager excited crowd. Woe to the short of stature, the very young and very old, the feeble of heart and lung, the stumbler or fainter. The terrible experience of the Coronation crowd of Moscow is suggestive of very unpleasant contingencies, should Police precaution fail and the crowd for any reason get out of control. Then there is the danger of overloaded stands. The County Council has taken special thought against this risk, and no stand has been erected for which license has not been sought and granted, and no license has been given without satisfactory guarantee of strength and stability, and above all there is the fear of fire. So much combustible material has been accumulated, and so much carelessness is habitually exercised in checking about smouldering matches and the stumps of cigars and cigarettes. Even the illumination which will be lighted up at night along the principal thoroughfares will be a source of concern and dread. Special arrangements are being made in view of the great peril. Firemen are to be stationed at regular intervals all over the town and engines kept ready for use at all depôts. The flood of Jubilee literature which is being let loose is appalling. The history of the last 60 years is being written and illustrated *usque ad nauseam*. The medical and surgical events of the period will be chronicled in full detail in special numbers of the leading journals. The *Practitioner* has already published its Jubilee number, and the weekly journals are preparing theirs. The May number of the *Nineteenth Century* contains a very instructive retrospect of "the progress of medicine during the Queen's reign," by Mr. Malcolm Morris, F.R.C.S., (Ed.). The items of progress which Mr. Morris chiefly dwells upon are neurology, laryngology, otology, bacteriology, anæsthesia, antiseptics, ovariectomy, the radical cure of hernia, brain, lung and abdominal surgery, litholapaxy, the reduction of puerperal and other septic fevers in hospital, the ophthalmoscope, laryngoscope, sphymograph, clinical thermometer, Röntgen photography, and many other aids to diagnosis, specialism as a development in study and practice, and the great revolution which has taken place in the theory and practice of thera-

peutics from the days of blood letting calomel and saline purgatives to the days of germinicides, antitoxins and animal juices and extracts. In fact a radical change has occurred during the Victorian era in pathology and praxis, and the change has been towards the better understanding of the nature and disease processes and thus more rational management. The era has also witnessed the rise and rapid advance of preventive medicine. This constitutes one of its principal glories, and there has been a great reduction of sickness and mortality resulting from more enlightened and efficient arrangements for the preservation of public health. Nor has India stood still during this period. Medicine and surgery have kept pace with European progress, and in many matters great activity, almost amounting to revolution, has been manifested. The development of medical education has been rapid and successful. The multiplication of charitable hospitals and dispensaries throughout the Empire very remarkable; and sanitation, though still backward, has been established on a firm and progressive basis. A medical profession has been created which is gradually feeling its way to organization; the mortality of the European army has been reduced from 70 to 15 per 1,000, and of the Native army from 18 to 15; and jail mortality, though still excessive, has been reduced. Vaccination has been extended and systematised, and the larger cities and towns have executed great works of water-supply and drainage which have had an excellent influence on the health of their inhabitants. These and other events will no doubt be mentioned with thankfulness in reviewing the incidents of the longest and most brilliant British reign.

The first annual dinner of the Indian Medical Service was a great success. Some eighty members of the service sat down to an excellent entertainment at the Café Monaco. Sir Joseph Fayrer presided with his wonted ability and suavity. The toast of the evening was proposed by Sir William MacCormac in happy terms, and in responding to it Sir Joseph Fayrer gave a most interesting sketch of the history of the Service, and alluded in an appreciative manner to the achievements in science and literature of the many able and distinguished men who have from time risen above the level of their fellows, and contributed to earn for the Indian Medical Service the great reputation which it has gained for capacity, industry and skill. Lord George Hamilton made an excellent speech in responding for the guests. He commented on the three great anxieties of his administration—famine, the plague and the excessive prevalence of venereal disease in the European army of India. On each of these subjects he made some interesting and sensible remarks. This dinner will now become a permanent annual function.

11th June 1897.

Transactions of Medical Societies.

THE BOMBAY MEDICAL AND PHYSICAL SOCIETY.

THE usual monthly meeting of the Bombay Medical and Physical Society was held in the Durbar Room, Town Hall, on Friday, the 7th May 1897, at 4-30 P.M.

The following papers were read:—

"CLINICAL TYPES OF PLAGUE," WITH "URINALYSIS."

By Surgeon-Captain J. G. Hojel.

MR. PRESIDENT AND GENTLEMEN,—It has been a noticeable and much commented on feature during the progress of the present epidemic that, step by step as the mortality from plague increased, so did that of certain other diseases, notably of remittent fever, less so, but nevertheless, markedly in that from phthisis and other respiratory diseases. These points were very well illustrated in a chart, and the following facts noticed:—A rise above the mean of 5 years, well marked in the curve of remittent fever, less prominent in the case of phthisis and respiratory diseases during the months of August and September. In October there was a slight decrease in the mortality from plague, so also in that from remittent fever; these rises and falls occur almost simultaneously. In November all the curves show a steady upward course, reaching the maximum in December and January; and now one sees that while the plague mortality is at its highest in February, that from remittent fever, phthisis and other respiratory diseases shows a marked decline, reaching almost normal in March. These are interesting facts, and point, in my opinion, to one conclusion, *viz.*, that there was no concealment (except to a very small extent) of plague on the part of the community, but that the increase in the diseases mentioned was due to faulty diagnosis, for one can see at a glance that while the mortality from plague remained stationary, that from phthisis, &c., appreciably decreased from February 1st onwards. In other words, we had come to know more about the various types and forms which plague can assume. In times gone by no one ventured to diagnose a case as one of plague unless there were external "buboes." How often would such a method of diagnosis have led us astray during the past nine months, is a question more easily asked than answered. Dr. Childe, at our last meeting, drew attention to the form of plague known as "pneumonic," in which external glandular signs are rare, and this form, I have no doubt, accounted for a portion, at all events, of this very considerable rise which occurred in the mortality from phthisis, &c.

To day I should like to read the notes of several cases which I have come across, which I may call (for want of a better term) the "Abdominal Type of Plague." These cases too, perhaps, account for some of the increased mortality from remittent fever in the past nine months. In their early stages these cases bear a very strong resemblance to enteric fever, and the differential diagnosis is extremely difficult. I speak now purely from a clinical point of view, as regards symptoms and signs, for bacteriological laboratories and apparatus are not scattered broadcast about India; besides which it is a fact that, in many cases, cultures made from the blood of plague patients prove sterile. It is all important, therefore, that one should be able to recognize such cases both for the good of the community and one's own reputation.

Case I.—A man, aged 38, had been at his work up to midday of the 18th February, when he had a severe rigor followed by fever and accompanied with abdominal pain, nausea and retching, but no actual vomiting, and 4-5 semi-solid motions. He continued in much the same condition until his admission on February 21st, when his temperature was 103°F., skin hot and dry, face flushed, expression anxious, conjunctive suffused, with severe frontal headache and considerable lumbar and abdominal pain; his bowels were now constipated, and his tongue was moist, covered with a moderately thick dirty yellowish white fur down the centre, with prominent papillae shewing through, angry looking, but clean at the tip and edges; pulse fairly full, but soft and easily compressible, 95. The temperature the following day had fallen to 101°F., and he had passed a fair night, but was very drowsy, disinclined to move or talk. He lay on his right side for the most part with legs flexed on the thighs and the thighs on the abdomen, and took little notice of what was going on around him. On the evening of the 22nd February some abdominal distension was noticed, with lumbar pain

and slight tenderness on pressure in the right iliac fossa. There was slight enlargement of the liver and spleen, the other organs appeared healthy; slight albumen in urine. On the morning of 24th his T. was $103^{\circ} 4F$, pulse 98, very soft and compressible; bowels were still constipated. He was very restless with low muttering delirium, floccitatio and capnology; he perspired profusely without any apparent effect on the temperature; a slight dry cough was present, but nothing definite could be detected in his lungs, and it was possibly due to chronic granular pharyngitis. On the morning of the 25th the report was that he had passed a very bad night and was very delirious. T. $101^{\circ} 2F$, bowels moved twice, stools yellow, semi solid and offensive; tongue was coated with a white fur in centre, red at tip and edges, and showed a tendency to dryness; he was greatly prostrated; pulse 105, large, soft, very compressible and markedly dicrotic; base of right lung dull on percussion with slight augmentation of breath sounds. On the 26th his T. was $103^{\circ} 6F$, pulse 110, characters as before; bowels moved once; tympanitis was present, but there was no actual pain. He was in a semi-conscious state, with low muttering delirium. On the 27th the abdominal distension had increased, the T. $101^{\circ} 2F$, while a small gland about the size of a pea (9th day of disease) was detected in the right femoral region, not tender and with no surrounding oedema. From this a specimen was obtained, which showed the plague bacillus in numbers, floccitatio, capnology and subsultus tendinum were very marked. On the 29th the distension had much increased, he had become more delirious, the liver was now distinctly enlarged downwards in the mammary line and painful on percussion, a small bright red eruption appeared scattered over the abdomen and chest, which was not effaced by pressure. He continued in much the same condition until March 1st, when his T. rose to $105^{\circ} F$. (reduced under treatment). He complained of pain at the level of the umbilicus, while the tympanitis had increased to meteorism: he perspired freely, gradually grew more feeble, became less delirious, passed his evacuations under him, and gradually sank and died on the morning of March 3rd, his temperature in the meantime having risen to $106^{\circ} 2F$. An autopsy was performed 12 hours after death. Slight rigor mortis was present; there was a slight effusion in left pleural cavity, but no adhesions, a few petechiae on visceral layer of pleura, some hypostasis at bases of both lungs, and edges of lobes showed signs of emphysema. On section the lungs were slightly oedematous and showed small hæmorrhagic spots. The pericardial cavity contained an ounce of fluid, the heart showed signs of fatty infiltration, and there were numerous minute petechial spots on the visceral layer of the pericardium. The right side was soft, flabby and friable, no other abnormality detected. The liver was increased in size and contained innumerable yellowish hard masses, which cut hard with a convex surface; there was some congestion in tracts, but no adhesions. There was no fluid in the peritoneal cavity. The omentum was studded with minute petechiae, the spleen was enlarged, dark red and friable, the kidneys slightly congested, otherwise normal. Pancreas, suprarenals and bladder were normal, the latter distended with urine. The stomach showed a few petechiae. While the upper portion of the small intestine was normal, the ileum was hyperæmic, the solitary follicles swollen and prominent to about the size of a hemp seed, and the Peyer's patches quite distinct, oedematous, swollen and somewhat raised above the surrounding surface. No petechiae were seen in this situation. One gland, in the right groin, belonging to the vertical femoral set, was enlarged to the size of a horse bean, hæmorrhagic on surface and on section, with a small amount of bloody oedema around it. Right iliac glands slightly enlarged, discoloured but not hæmorrhagic. The left femoral glands (vertical) were also enlarged but normal in colour. The remaining glands, with the exception of the bronchial (which were somewhat enlarged), appeared to be quite normal.

Case II.—B. W., aged 15, male, at 5 P.M. on the 21st March, was suddenly seized with a severe rigor. With the exception of a slight headache and some giddiness, the result of a fall a month previously, he had, up to the time of seizure, been in good health. During the night of the 21st vomiting was distressing, but the next morning he felt better, though fever continued for four days, compelling him to remain in bed. On the 26th March, the 5th day of illness, not finding himself improving, he sought admission into hospital. The symptoms present were—somewhat flushed face, pupils dilated, conjunctivæ suffused, expression anxious and fearful; he had slight lumbar pain, his tongue was covered with a yellowish white fur in the centre, red at tip and edges, and moist; the pulse was 110, soft, regular, moderately large and compressible to some extent; the respiration 40 and shallow; he lay chiefly on his right side with his legs drawn up. There was no glandular enlargement: with the exception of slight enlargement of the liver and spleen, nothing abnormal was detected in the various organs. He continued in much the same condition for the following two days

very drowsy at one time, restless at others; he vomited almost incessantly and lay in a semi typhoid state, the temperature varying from 101° to $103^{\circ} F$. On the 29th the vomiting became less frequent, while some distension of the abdomen had appeared, but there was no tenderness or gurgling in the right iliac fossa. On the 30th the pulse was markedly dicrotic and respirations more hurried; the bowels had been moved four times in the previous 24 hours, offensive, liquid and yellow; the T. reached $115^{\circ} 2F$ in the afternoon. On the morning of the 31st the T. had fallen to $100^{\circ} 8F$; the bowels had been moved seven times with the same characters as before; he had vomited twice, and was very delirious during the night. On the 1st April the notes were as follows.—4 motions, liquid, brown and offensive, pulse 110, dicrotic; subsultus tendinum; tongue covered with a thick brown fur for the most part but red at tip and edges, moist. An eruption on the abdomen, somewhat like 'typhoid rose spots,' but not readily effaced on pressure. During the following day the T. rose to $105^{\circ} F$, he became very violent, and had continuous muscular tremors. There was a slight cough, and tympanitis had increased considerably; sphincters were relaxed. On the 5th the delirium became low and muttering, the muscular tremors more constant and severe, and bowels still loose, the pulse small and running; moist rales were audible all over the lungs. These symptoms became aggravated, until on the morning of the 8th his T. rose to $107^{\circ} 6F$, and he died exhausted. A limited autopsy could only be obtained, performed 2 hours after death. The spleen was increased in size, dark red and friable, kidneys in the same condition; no petechiae in small intestine; Peyer's patches were slightly raised and congested at their margins; a few petechiae noticed at the apex of the heart, mesenteric, iliac, and retroperitoneal glands were enlarged and hæmorrhagic.

Case III.—J. S., aged 9, was admitted into the hospital on the 16th March. She had arrived from Quetta 10 days previously. On the evening of the 14th, at 6.30 P.M., having been playing in the sun she complained of frontal headache and refused her meals but had no "chills" or "rigor." During the following night her T. rose to $105^{\circ} F$, and she became drowsy and was brought to hospital on the following morning; her face was flushed, conjunctivæ suffused, very drowsy with contracted pupils. The tongue was covered with a dirty white fur in centre, tip and edges clean, all the organs appeared healthy, but there was frequent vomiting; no diarrhoea; no enlargement of glands nor tenderness in the course of the lymphatics. She had numerous scratches on upper and lower extremities. The T. on the 17th was subnormal, but, on the same evening, rose to $105^{\circ} 4F$; she became restless with slight wandering delirium, the bowels were moved once. There was distinct distension of the abdomen, which was not tender anywhere, and she complained of slight pain in her back. On the 18th March the general condition was the same, but rose spots were detected on abdomen and chest, while two small glands had also appeared at the right side of neck. The T. at 10 A.M. was $104^{\circ} F$, and the pulse was dicrotic, soft, large and compressible, 126 per minute. The glands rapidly increased in size up to a certain point, were painful on pressure, but there was not much surrounding oedema, the breathing became shallow, and there was great difficulty in swallowing, and retention of urine; the T. rose to $106^{\circ} F$, the pulse became running, and she gradually sank and died at 10.45 P.M. The post mortem was held 12 hours after death; rigor mortis passing off. There were two small glands on right side of neck, posterior to centre of sternomastoid muscle; hæmorrhagic on surface and section, no surrounding oedema. Right tonsil slightly swollen. There was 1 ounce of fluid in pericardium, a few petechiae on visceral layer of same near apex. No fluid in pleural cavities slight congestion of lungs; liver slightly enlarged with some congestion. Spleen enlarged, dark red and friable. Suprarenals slightly congested; kidneys swollen and congested, capsule non adherent, cortex increased, pyramids prominent. The left ovary showed hæmorrhages into its substance; right one and uterus normal, slight congestion with a few petechiae on wall of stomach. Intestines at their lower portion were slightly congested, the Peyer's patches were enlarged, prominent and congested; solitary follicles normal; vermiform appendix showed marked congestion; the mesenteric glands were markedly enlarged, slightly hæmorrhagic on surface, but not so much on section. The retroperitoneal glands were increased in size, two especially, close to the pancreas, being enlarged and hæmorrhagic; slight increase in size of both femoral and inguinal glands on both sides, but no hæmorrhages and no oedema, and normal in colour.

Case IV.—E. D., aged 17, female, admitted on the 26th March, a hæmophilic. At dinner on the previous day she felt a slight shiver, which lasted a very short time: she took no notice of it, but continued nursing her brother up to 1 o'clock A.M., and then retired to rest. (The brother had been under treatment for typhoid fever for some time previously.) At 6 A.M.

the next morning she arose, feeling quite well, and went for a bicycle ride, but felt the sun a little while returning. She took her breakfast as usual, and carried on her daily avocations until 12 noon, when, while writing, she felt slightly "headachy" and went to bed. Her temperature was taken and was found to be 101°F. Towards evening she had a slight rigor. On her admission the face was flushed, pupils dilated, skin warm and moist, T. 103°F., tongue coated with a thin white silvery looking fur, moderately red at tip and edges, and moist. The pulse was 120, 'quick,' soft and fairly compressible; respiration 28, regular. She complained of headache, for the most part confined to the left side. No glandular enlargement nor tenderness in the course of the lymphatics. Nothing foreign detected in any of the organs. During the night of the 26th she perspired profusely, but slept well, and awoke on the 27th, feeling much better and quite cheerful, the T. being 100°F. During the day, however, the T. gradually rose to 104°F. at 2 P.M., and 105°F. at 4 P.M. Her skin became very hot and dry, the cheeks flushed, and she complained of severe headache and lumbar pain. At 7 P.M. the T. reached 106°F. She was very restless during the night. On the 28th morning the T. had fallen to 104°F., the pulse 120; same characters as on admission. From this onwards there was a gradual and decided fall of T. to 4 P.M., when it was 101°F., and remained much about the same until the next day. There was slight diarrhoea, tongue distinctly typhoid in character, and she had a little bloody oozing from the nose. In the afternoon of the 29th the T. suddenly rose to 103°F., but fell after a dose of phenacetin. There was now epistaxis, slight from 3 to 6-30 P.M., but from 6-30 to 8 P.M. very severe, and necessitating plugging with lint soaked in hazeline. On the morning of the 30th the T. had fallen to 99°F., the headache had disappeared, and she was quite cheery and talkative, but slight oozing continued from the nose until the 31st, when the T. had again risen to 102°, and the pulse 120. Menstruation had come on very scanty and slightly offensive, while the abdomen had become distended and tympanitic, the bowels being constipated. Severe lumbar pain was complained of. On the 1st she was dull, drowsy and apathetic, tongue brown, slightly dry, decubitus dorsal. The pain in the lumbar region was very severe, and there was some tenderness over the abdomen. The T. was 101°F., pulse 112, of better volume. Passed very little urine during the previous 24 hours. One femoral gland (right side, vertical set) was slightly enlarged and tender. From this date she gradually became better, the gland never becoming prominent nor very painful until the 11th, when the T. suddenly rose to 103°F. (after being practically normal for 6 days), and the gland more swollen and painful. This was quite temporary, and she made an uninterrupted recovery.

Case V.—I give a short summary of this case by way of comparison, in which the symptoms were almost identical with those of cases I, II, III and IV.

A. K., aged 20, male, lately returned from Mombasa, and living in the same house and floor as a patient who had been admitted into hospital with plague of the 'bubonic type.' He had been in Bombay for about 2 months, and had suffered in that time from several attacks of "Mombasa fever." A few days before admission he was laid up with what he thought was another attack of this fever, ushered in by chills, slight headache and lumbar pain. On admission he appeared fairly well nourished, had a T. of 100°F., and headache. His tongue had a thick fur down the centre, pale red at tip and edges, and was broad, flabby, moist and indented at the edges by the teeth. Bowels were regular, there was slight enlargement of spleen; the other organs appeared healthy. But there was some tenderness of abdomen. In the left axilla was an enlarged gland, as also in left groin (vertical femoral); some thickening of the lymphatics on right side, but no tenderness in any of these situations. The maximum T. on the 1st was 103°F., and he had passed a very restless night. On the 2nd his T. had fallen, his pulse 95, fairly large and markedly dicrotic; diarrhoea to the number of 4 motions—watery, brown and offensive—had come on, and his pulse had become more frequent. He was still very restless. He continued in the same condition until the 7th, when slight tympanitis was apparent, and the glands had become a little tender on deep pressure. The tympanitis gradually disappeared until the morning of the 11th, when it was quite natural. He was now delirious at night, tossing from side to side, and very troublesome. On the 12th he was again tympanitic, lips and teeth covered with sordes; slight pleural effusion was detected on right side with mucous rales in front; he was still very restless, had low muttering delirium, subsultus tendinum, and floccitatio. On the 13th the above signs continued, but the pulse had become more soft, compressible and dicrotic, rate 110. The cough was troublesome and the breathing hurried and shallow, the delirium noisy. At 4 P.M. his T. rose to 103°F., a cold clammy sweat broke out, and he became collapsed; he never rallied, grew gradually worse and died comatose at 10 P.M.

I am indebted to Surgeon-Captain Lenmann for the reports on the autopsies.

Clinically speaking, the preliminary stages of all these cases, as was the fact with all those of which I have notes, were all in favour of their being enteric fever, with the exception, perhaps, that in the presence of an epidemic such as we have had with us, all cases were viewed with more or less suspicion until they were proved to be otherwise than plague cases. The differential diagnosis in these early stages is, to my mind, extremely difficult, and the importance of early diagnosis is apparent to all. On what points can we rely in making such a diagnosis? During the past few months we have heard a good deal about the typical this and the typical that of plague, with particular reference to the tongue, the decubitus, the aspect and the pulse. When we come to analyse these, we very soon come to the conclusion that there is no one sign or symptom pathognomonic of plague, which is not a matter for surprise, seeing that it only follows in this respect all other diseases (I am leaving bacteriological diagnosis outside the question, as it is not always obtainable in this country). Can, therefore, a sign be called typical which may only be present in half the number of cases? In the absence of glandular enlargement there are certain points, I think, which make the diagnosis possible, but these points must be taken collectively and not separately. Decubitus helps us nothing, for plague patients lie chiefly in that position which gives them least pain, the decubitus depending on the situation of the hubo when there is one. In these abdominal cases, however, one notices that a good many of them lie for the most part on one or other side, preferably the right, with legs and thighs flexed, in a crouching attitude, while in enteric the decubitus is chiefly dorsal. One may see all varieties of tongues, but there is one which, if present, may be considered distinctive, *viz.*, a slightly swollen, fairly large tongue, covered with a thin silvery-white looking fur, with prominent red papillae, the tip and edges being red and somewhat irritable, and the whole tongue moist. As regards aspect, there is a peculiar, indescribable, dull, heavy, apathetic and stricken look; conjunctivae suffused, pupils normal as a rule, the whole eye being dull and muddy looking. Some patients show a lemon yellow colour of the skin. The onset is sudden; as a general rule one's patient, if intelligent, can tell the hour, almost the minute, of his seizure. The temperature has a high initial rise to 103°, 104°, 106°F., with a remission to normal on the 2nd or 3rd day (in two cases this character was not present), and a secondary remission frequently from the 4th to the 6th day (*vide* cases III and IV). I have heard it stated that plague has no distinctive chart. Those of us who have had much to do with the disease will, I think, agree with me that there is. Severe lumbar pain is another sign which is very often present. Abdominal distension occurs early, on the 3rd, 4th, or 5th day. The pulse, large and full at first, is peculiarly soft with great want of sharpness in the stroke and very compressible at an early stage of the disease; it is also dicrotic, but to my mind the dicrotic character is not so readily recognized by the finger as it is in enteric fever. The diarrhoea which is frequently present differs quite in character from that seen in typhoid.

Appended in parallel columns I have put the differential diagnoses of the two diseases:—

Plague.

1. Onset sudden, usually ushered in by a well-marked rigor.
2. Temperature shows a high initial rise in most cases, followed by a marked remission to normal or a little above or below it on 2nd, 3rd, or 4th day.
3. Pulse, large and full at first, peculiarly soft, great want of sharpness in stroke, very compressible at an early stage and dicrotic, but the dicrotism is not very easily recognized by the finger.
4. Aspect dull, heavy and apathetic; has a peculiar stricken look.
5. Eyes dull and muddy looking, conjunctivae suffused, pupils mostly normal, general flushing of face.
6. Diarrhoea simple, but very offensive (when present).
7. Delirium and other cerebral disturbance early, and great prostration from the first.

Enteric.

- Insidious in onset, may have, "chills."
- A gradual rise to end of first week, with slight daily remissions.
- Pulse moderately large, walls of vessels relaxed, beat sharp and short, dicrotism well marked and easily distinguished.
- Not so, but often has a bright energetic appearance.
- Eyes bright and clear, no suffusion of conjunctivae, pupils dilated, a circum-scribed malar flush.
- Diarrhoea 'pea soupy.'
- Later, towards end of severe cases.

Plague.	Enteric.
8. Abdominal distension early, 3rd, 4th, 5th day.	Later.
9. Eruption not readily effaced, a "deep red colour, petechial."	Eruption readily effaced, "rose red colour, non-petechial."
10. Severe lumbar pain in many cases.	Slight.

To these may be added the condition of the tongue (when present as above described) and the decubitus (unreliable signs, in my opinion), and the history (also unreliable), of one of the cases quoted, who had probably been infected with plague through nursing two of her servants suffering from the disease, had also been nursing an enteric fever patient, while the enteric fever case No. 5 had been living in a hotbed of plague). I must apologize for the roughness of the notes of the cases read to the meeting, and can only hope that they will illustrate the difficulties in the matter of diagnosis.

Summarising the results obtained, I may say that the urine is for the most part transparent when passed; its colour varies from light yellow to brownish red or even red from the admixture of blood. The quantity in 24 hours is markedly diminished, and in some cases almost suppressed, the average of these 50 cases being 874.6 c.c. It is sharply or even intensely acid, the acidity as well as the quantity approaching normal during convalescence; in two cases not written down in the table the urine was 'amphoteric.' It readily decomposes on standing for a short time with the deposition of triple phosphate. The sp. gr. ranges from 1010 to 1035, and shows little change, the average being 1021 approximately. The quantity of urea is markedly diminished in 74 per cent. of the cases, less so in 26 per cent. but lower the normal in almost all, the average being 1.94 per cent. Uric acid is likewise diminished. A noticeable feature in the urinalysis is the marked reduction of chlorides which were absent in 22 per cent., greatly diminished in 64 per cent. and approaching to, but not quite reaching, normal in 14 per cent.; they gradually increase as convalescence approaches, and this increase may be considered a favourable prognostic sign. Sulphates do not show much alteration, being less than normal in 8 per cent. Phosphates are diminished in 88 per cent., but were excessive in 12 per cent. Solids are diminished, the average being 43.83 grammes per diem. In estimating the solids no deduction was made for rest in bed, age, or body weight. Albumen was present in a large proportion of cases, viz., 72 per cent.; the amount as a rule was not great, but in three cases the albumen was 50 per cent. The occurrence of albumen is so frequent that it may be considered a usual rather than an unfavourable sign. In some cases, however, it co-existed with uræmic symptoms; in many cases it is merely temporary and disappears during the apyrexial period of the disease. Globulins were present in 16 per cent., peptones in 6 per cent., albumoses in 28 per cent., bile in 32 per cent., sugar in 2 per cent. Indican was marked in 74 per cent., while a mere trace was present in 26 per cent. of the cases. Leucin and tyrosin were present in 2 per cent., acetone in 2 per cent., while diacetic acid was never detected. The diazo reaction, as applied to plague urine, gave a port wine or claret red colour; it was present in all cases, but varied a little in intensity in a small number. As regards the sediment, hyaline, granular, epithelial, and uratic casts were found in 24 per cent.; epithelium, blood, amorphous urates, uric acid, triple phosphates, urates of soda and ammonium were found in various cases.

REMARKS ON THE PATHOLOGY OF PLAGUE.

By Surgeon-Captain B. H. F. Leumann.

MR. PRESIDENT AND GENTLEMEN,—While on the one hand the study of the pathology of a disease helps us to understand its nature, so, on the other, in order to be in a position to offer a satisfactory explanation of the changes—macroscopic and microscopic—which pathology reveals to us, it is necessary to study—clinically and otherwise the methods by which it invades the body. Applying this as our text to the consideration of the pathology of plague, I shall endeavour to show from notes on a few cases and *post-mortem* that I have made, how far the generally accepted view holds good that Kitasato's bacillus gains an entrance into the human body—(1) by inoculation through a wound or abrasion either of the skin or mucous membrane; (2) by direct inhalation into the lungs; (3) by the digestive tract; and although I personally have not seen a case which could be satisfactorily explained *post-mortem* by this method of infection alone—(believing that, in most cases at any rate, a local inoculation of and not absorption by the intestinal mucous membrane occurs), I fully admit its possibility.

Firstly.—*Local Reaction after Inoculation through a Skin Abrasion.*—The following case, although it never reached the *post-mortem* room, is nevertheless extremely interesting, as it

affords direct evidence by bacteriological research of local inoculation of, and local resistance by, the organism against the micro-organism.

Note.—Those cases in which the sediment is marked *nil*, means that it was so slight as to be unimportant.

The patient, an Eurasian, aged 30, was admitted to the Plague Wards of St. George's Hospital on March 23rd, with a history of 20 hours' illness, which began with a slight rigor, followed by nausea, frontal headache and fever. Twelve hours after he felt pain in the right groin and found a "bubo" there. His work had been 'house-to-house-inspection,' and he had helped in the removal of plague cases and the disinfection of the quarters in which they lived. On admission his temperature was 104° 6F., and he had those general symptoms of plague, which it is not for me to enumerate to you who know them as well as I do. The points to notice are that his uppermost right femoral gland was enlarged to the size of a walnut, very painful on manipulation, quite free, and the skin over it normal. The other femoral glands on that side could be felt to be enlarged slightly, and were markedly tender, but quite distinct from one another; further, on the outer side of the dorsum of his right foot, we found a tiny scratch, and this was particularly noted—after some discussion with my nurses, who regarded it as insignificant—by myself and the Assistant Surgeon at the time.

In three days these glands had become fused together into a large hard brawny mass, the size of an orange, and the patient's constitutional symptoms very severe—the temperature frequently being 105° F., once nearly 107° F.—and the man himself in a continuous condition of low muttering delirium. Daily bacteriological examination of his blood was made. On the fifth morning, after his admission, I pricked a small bulla, which had been shown me by the nurse the evening before, and which had developed on the identical spot where the scratch we detected on his admission had been seen, and inoculated an agar-agar tube with some of its serous contents, and at the same time I made another similar inoculation with a drop of blood taken from his finger.

The results I obtained from the kernel of my story.

On no single occasion did I obtain any growth from his blood—the agar-agar remaining perfectly sterile—while at my first inoculation from the serous fluid of the bulla on his foot I obtained a copious growth of plague bacilli—I pass round these two tubes, one taken from his blood, the other from his blister, for you to look at,—and on the bulla reforming the next day, I repeated my experiment and obtained the same results.

This case, I think, explains itself. The man was inoculated in the foot, and most of the bacilli passed to the femoral glands, which proved effective barriers against their further progress. His marked constitutional symptoms were due to the absorption either of dead bacilli or of their toxin or both from these localities; while the fact that no bacilli were at any time found in his blood shows, in my opinion, that the disease remained local, and the septicæmic stage was never reached.

The reason why the bulla formed so late and at all lies in the fact that some few bacilli remained behind at the point of inoculation (the majority having passed up to the femoral glands), multiplied and produced this local lesion, whereby I was enabled later on to capture some of them and their offspring.

As a parallel to this case I draw your attention to that of a young girl who had a cut on her left forefinger with typical general symptoms of plague, on admission, and an enlarged tender cubital gland at the left elbow. Three days later this patient, whose temperature had averaged 103° F., had her left axillary glands painfully enlarged and also her right femoral glands and spleen. I punctured all these glands (a procedure I never do now as I consider it to be highly dangerous) and aspirated out some of her spleen pulp in a hypodermic syringe, and made inoculations on separate agar-agar tubes, at the same time taking a similar preparation from her finger blood. My results (to quote from my notes) were these—"All the tubes sterile, except that inoculated with exudation from the left cubital gland."

Here again, you see, another similar local process, showing local resistance and reaction of the organism against the micro-organism, and I could relate many more such cases, only time will not permit.

Secondly.—*Septicæmic Plague following Inoculation.*—Here the process above-mentioned spreads further, the power of resistance of the organism is lowered or may be but slight from the very first, and the bacilli become generalized throughout the body, reaching the blood either by the lymph-channels or, in some cases, by direct extension into the veins in or around the glands and producing a true septicæmia. Such cases are almost always, if not invariably, fatal. I have only heard of one, in and from whose blood plague bacilli were found and cultivated, which is said to have recovered.

Case I.—That of a Hindoo male, aged 30, was brought into the Jamsctjee Jeejeebhoy Hospital and died in a few hours on February 19th. History stated briefly that he had been ill 3 days, and little else was known about him. As I helped in the autopsy, I ask Professor Child's permission to read an abstract of this case.

Post-mortem we found superficial enlargement of the glands of the right and left axilla, neck, and groins. There were several scratches on the hands and feet. The glands in his right groin were bigger than those elsewhere. On opening the body all the lymph-glands were found enlarged, especially the right femoral, right iliac, and the retroperitoneal and mesenteric, but none showed hemorrhagic infiltration. On the surface of the lungs, which were slightly congested, and at the apex of the heart were a few scattered petechiae, very minute and difficult to see at first: similar tiny spots were found at the cardiac end of the stomach, but the intestine and other abdominal viscera were apparently free from them. Beyond cirrhosis of the liver nothing else noteworthy was observed in that organ, and although the kidneys, supra-renals, bladder, pancreas, testicles, pharynx, larynx, and œsophagus were carefully searched, no lesions were discovered. The spleen, however, was enlarged to about thrice its normal size, blue-grey on the surface, with a mulberry-like soft interior acutely congested, but yet with a marked increase of fibrous tissue in its stroma, thus shewing the enlargement was not wholly due to recent changes.

Bacteriologically Dr. Bitter found and showed me pest colonies on agar-agar from the spleen, right femoral and mesenteric glands, and blood. Most colonies were obtained on those cultures taken from the spleen and femoral glands.

Here we have acute plague, causing little more than simple enlargement of all the lymphatic glands, ending fatally by a septicaemia.

Case II.—A European, aged 45, was brought to St. George's Hospital, with a history of eleven hours' illness, which began with a rigor and was followed by frontal headache, fever, nausea and great depression, and the development of a painful lump just below the jaw on the right side of the neck, which rapidly enlarged.

On admission I found, besides the usual signs of plague, the lymphatic glands over the right parotid and submaxillary glands much enlarged, very painful, and embedded in considerable œdema. The inguinal glands on both sides were also enlarged and painful. He had many acne-like spots and pimples on both sides of his face and neck, but neither a sore on his penis nor gonorrhœa; and no scratches were discovered on his hands or feet.

This case terminated fatally, 36 hours after admission, by spreading of the œdema upwards all over the right side of his neck and head, and downwards over and under the clavicle on to the chest and into the axilla; and by similar implication of the glands on the left side of the neck pressure was caused on his trachea, stridulous and gasping respiration (simulating diphtheria) followed, and death occurred practically by simple suffocation.

Ten hours before death one could not feel his trachea at all, so marked was the œdema over it. An agar tube which I inoculated with his finger-blood 18 hours before death yielded nothing but a crowd of pure pest colonies.

The post-mortem examination, which was made 4 hours after death, revealed the following state of things:—

Bright red subcuticular mottling (which the Sister informed me, came on as the man was dying, and which I found quite distinct from that seen over his buttocks and limbs due to *post-mortem* changes) extended all over the back and right side of his neck, from the top of his head above to below the level of the 4th rib in front, 7th rib in the axilla, and over the right scapula behind. The swelling over all this area was very great, most marked in the neck and axilla, pitting deeply on pressure. There was considerable œdema on the left side of the neck also, but not nearly to the same extent, nor was the skin discoloured as on the right side. Many bright red petechiae were seen on the back and front of both elbows. The conjunctivæ were injected throughout, showing many small petechiae, but the mucous membrane of the nose, lips and gums was blue-red and cyanosed. The parotid, submaxillary and axillary glands on the right side felt enormously enlarged, and the other superficial glands to a less degree.

On opening the body, a diffuse subcutaneous and intramuscular hemorrhagic œdema, not visible from without, was found extending from the angle of the ribs to the umbilicus, most marked on the right side in the substance of the rectus muscle. In the parietal peritoneum were a few scattered petechiae on the right abdominal wall, while more were found in the visceral layer over the cardiac end of the stomach.

The liver was much enlarged, showing early hypertrophic cirrhosis, with here and there petechiae and pale yellow surfaces. On section its substance was dull red, soft, bloody, and friable.

The gall-bladder was distended with dark tarry bile and showed numerous minute petechiae in its walls and mucous membrane.

The spleen was enlarged to thrice its size, congested and hemorrhagic throughout, and shewing many petechiae in its capsule. Section revealed a dark red, soft mulberry-like pulp, very œdematous and friable.

Kidneys.—Hæmorrhages in great number in the capsule, surrounding areolar tissue, and on the surface of both organs, which were much enlarged. The capsules quite loose: cortex increased and pale, with innumerable minute petechiae, the pyramids standing out in striking contrast, dark red and congested. A few scattered petechiae in the pelvis.

The ureters appeared normal without and within.

The supra-renal bodies were enlarged and hemorrhagic; in the *pancreas* nothing noteworthy.

The walls of the *stomach* were much thickened, soft and œdematous, with many scattered petechiae in the visceral peritoneum at the cardiac end. The mucous membrane was congested bright red in blotches, and small hæmorrhages and petechiae were seen in its substance, especially at the cardiac end. The rugæ stood out very prominently.

Numerous petechiae and patches of congestion were noted in the intestine, mostly in the ileum and transverse colon. Peyer's patches were prominent and very slightly hæmorrhagic in parts, and the solitary glands were much swollen. The *bladder* was distended with oz. viii of clear urine; its wall thickened and œdematous and the mucous membrane congested.

On opening the chest clear serous fluid was found in both pleural cavities about oz. iii in each, and about oz. i in the pericardium. No hæmorrhages on the parietal pleura, but on the visceral layer over the front of the lower lobe of the right lung were 10-12 small ones, irregular in shape and position. Both lungs were congested and œdematous, especially at their bases, and frothy bloody exudation oozed out on section.

The parietal pericardium was free from petechiae and hæmorrhages though many of both were seen in the visceral layer at the apices of the ventricles, back and front. The right heart was dilated, and its muscle very soft; the left side was slightly hypertrophied; and both contained much white and red clot lying in dull, dark red blood, which was extraordinarily thin and liquid. The endocardium appeared natural.

The larynx showed enormous œdema glottidis, which was as big as a chestnut on the right side and completely closed up the entrance. The whole mucous membrane was œdematous and congested, and much sero-mucous frothy exudation was found in both larynx and bronchi.

On dissecting up the neck, the bloody œdema was so marked that the cricoid cartilage was more than two inches below the surface, and the thyroid gland could hardly be made out, so soft and pulpy did it feel. Quite two pints of this bloody serous fluid ran out on to the table as the dissection was being carried on.

The Lymphatic Glands.—Those over the right submaxillary and parotid glands, as well as those glands themselves, were increased to the size of a large mango, spongy, dark red, œdematous, and hemorrhagic, both on surface and on section, and had fused into one another involving also the right cervical glands, which were hemorrhagic, and matted together into a huge sausage-shaped mass practically continuous with the similarly affected right axillary glands below. No set could be cleanly dissected out, the bloody œdema in this situation involving everything.

The right carotid, jugular, axillary, subclavian veins and their branches were found imbedded in a mass of gelatinous glandular tissue, and directly infiltrated by hemorrhage from without inwards, all their coats, where the glands had been in direct contact with them being stained dark red; and while but little of their course appeared lighter in colour none looked normal. The corresponding arteries were but slightly affected, and only externally.

On the left side the parotid, submaxillary, and cervical glands were hemorrhagic to a far less degree, and the œdema was rather serous than bloody. All the other glands of the body were enlarged, very congested on the surface, and distinctly hemorrhagic on section.

Unfortunately, the skull was not allowed to be opened, and so no examination of its contents could be made.

Bacteriological examination showed crowds of pure pest colonies on agar inoculations made from the œdema in the neck, heart's blood, cervical glands, and spleen. In the bronchial exudation mostly streptococci were seen.

Two mice inoculated with the pest cultures so obtained, died in 48 hours, and pest bacilli were recovered from their spleens and blood.

I am indebted to Dr. Bitter, of Cairo, for his kindness in allowing me to help him in the bacteriological examination of this case.

Here we have what I have learnt to call the 'hemorrhagic form of plague septicaemia'—an acute extension occurring straight through the vessel walls from the glands in the neck

while resistance in those glands was but slight. It is probable that the primary inoculation was through one or more abraded acne spots on this patient's face.

Another variety of plague septicaemia is occasionally seen, in which *post-mortem* one finds nothing more than, perhaps, only a few minute petechiae, which might easily be overlooked or slight glandular enlargement without any marked hemorrhagic infiltration; and yet crowds of pest colonies can be grown from the blood and spleen.

Thirdly.—The Pneumonic Variety of Plague.—As this variety has already been described by Professor Childe in the interesting paper he read at our last meeting, I shall do no more than lay stress upon the two forms in which it may occur. Plague may invade the lung alveoli from without the bacilli being breathed in, in which case we may call it "Primary Plague Pneumonia"; or it may involve the lungs amongst other organs during the course of the septicæmic form, in which case we have "Secondary Plague Pneumonia." It is most important to distinguish between these two varieties. In both of them pest bacilli are found in the sputum, but in the former they are present practically from the very first in that thin characteristic muco-serous sputum, which may or may not be coloured a faint pink throughout from the presence of blood, as well as in the viscid bloody matter which may be expectorated later: whereas in the latter they are not seen until hemorrhages or infarcts of pest have occurred in the true pneumonia or other complicating lung trouble, when the bacilli can be found in the sputum, which is characteristic of the local disease itself from the very first. Further, just as ordinary pneumonia may be lobar or lobular so may the lung invasion by pest bacilli take either form, although the lobular variety appears to be the more common. During life, in primary pest pneumonia the onset of the disease may be somewhat insidious; general clinical symptoms develop late or hardly at all; the tongue cleaner, and the pulse and even respiration rate lower at first than what one would expect in such an ætuo lung affection, or indeed finds in ordinary Frænkel's pneumonia. On the *post-mortem* table in death from the former, very few glands except the bronchial glands are found involved—unless the case has lasted some days, when others will be involved by the extension of the disease from a local to a general process; but in death after secondary pest pneumonia general glandular enlargement with its characteristic signs is almost invariably seen.

Fourthly.—Invasion by Absorption from the Alimentary Canal.—Although I have frequently seen the mesenteric glands enlarged I have not yet seen a case in which they alone were enlarged, or in which I could find any definite local intestinal lesion proving that absorption had taken place in the alimentary canal. The most marked instances of congestion of the stomach with hemorrhages and petechiae, and similar lesions of Peyer's patches, and other intestinal glands that I have seen, have been in those cases where I have been able to trace other points of inoculation and to a certain degree watch the spread of the disease in the body before death. On the other hand, this is quite a likely mode of invasion, and should not be forgotten as a possible one.

In trying, Sir, to give examples of the methods by which Kitasato's bacillus invades the body, producing plague, I have indirectly touched upon one of the most important means of its spread, and that least likely to be generally sought for, although Professor Childe has laid great stress upon it, namely, the sputum in the pneumonic cases. From their habit of sleeping on the ground using their hands as for the sick to spit into, and other similar traits, natives spittoons are very likely to be infected with pest by the lungs.

The moist or recently dried (but still virulent) bacilli from the sputum, and in many cases from the pus of the buboes, or even blood—either by itself or in the urine or feces as well—may gain an entrance into the human body.

My belief is that local inoculation through the skin is the most common mode of invasion in pest, especially in the poorer class in natives, whose hands and especially whose feet are nearly always covered with cuts and scratches. We know that the minutest abrasion will serve for the entrance of so tiny a foe; and I can only say concerning statements that "not more than 5 per cent. of the cases show traces of direct inoculation" that I myself and others have had a very different experience even in some of the very same cases. Once the bacilli gain an entrance into the body, they pass onwards, along the lymph-channels, and the question of their ultimate fate and distribution lies between their own virulence and the powers of resistance, local and general, possessed by the organism. That some attempt at resistance locally is practically always made is shown by the congestion and painful enlargement of those lymph glands, whether superficial or deep, which lie nearest or approximately near the point of inoculation. In those cases where the nearest glands appear to be unaffected, but others farther on suffer, the explanation probably is either that those glands did not offer sufficient resistance as a barrier or filter to the progress of the

acilli or that the bacilli themselves were so virulent as to readily overcome this resistance. And thus the bacilli may pass from one set of glands to another until they finally get into the ultimate lymph-vessels, and in this manner be conveyed into the blood-stream; or they may gain an entrance directly into the veins—as in the hemorrhagic case I have related—by direct extension through the vessel wall. On the other hand, they may remain locally and die, setting free their toxin, which will produce the clinical symptoms with which we are all familiar; and later on the glands where they have lain may break down under the continued strain of resistance and suppurate, or, perhaps, if the process be less severe, they may undergo resolution. If suppuration ensues, one does not always find pest bacilli in the pus, even at the moment of opening the abscess, and the reason for this appears to be that the bacilli have died and so cannot develop colonies on culture media; but one often does find them, especially if the bubo be opened as soon as pus fluctuation is detected, and hence many consider it to be a safer plan to wait until the process of pus formation is well advanced before opening the buboes, an opinion with which I myself am inclined to agree. In some few cases, instead of pest bacilli being found in the pus of these buboes, streptococci are discovered. The explanation of this occurrence is not so easy, but it may be that a secondary inoculation has taken place; and, indeed, in a few cases examined *post-mortem*, I have seen both pest bacilli and streptococci obtained from the pus of the same gland.

It may be argued that the initial rigor in plague is due to a direct invasion of the blood-stream by the bacilli, but I must say I cannot see why this should be regarded as a *sine quâ non*. That it may undoubtedly be the true explanation in acutely fatal cases I fully admit, but in non-fatal cases, or in those in which a local re-action at first occurs and persists for some time before the general septicæmic stage is reached, I believe the initial rigor to be due to absorption of toxin from the local primary area or areas; and, as a parallel instance, I point to M. Haffkine's system of inoculating dead pest bacilli, with their toxin, under the skin, where initial rigors, occurring a few hours after inoculation, are fairly common, and even later glandular enlargements not so very rare. Further, in an ordinary typical Frænkel's pneumonia, which goes on to recovery, one sees an initial rigor of great severity—and this in a case where the micro-organisms are certainly quite local at first and remain so.

I must apologise, Sir, for the length of my paper, but the importance of the subject is the excuse I beg to offer.

Specimens shown.

- I.—Hemorrhagically infiltrated pest glands along the course of the right femoral and iliac vessels and inferior vena cava (from a case of hemorrhagic pest).
- II.—Portion of spleen in acute pest, showing great congestion, and hemorrhages due to embolic infarctions.
- III.—Microscopic preparation of pest bacilli from a gland.
- IV.—Microscopic preparation of pest bacilli from œdema in lung.
- V.—Microscopic preparation of pest bacilli in a section of a gland.
- VI.—Microscopic section of lung in primary pest pneumonia.
- VII.—A culture of pest colonies on an agar slant.

OUTLINE OF SYMPTOMS OF PLAGUE.

By Surgeon-Major W. R. Lyons, M.D.

MR. PRESIDENT, LADIES AND GENTLEMEN,—I regret that I have not had time to prepare a paper on the clinical features of the plague. The remarks I am about to make are with a view to raising a discussion, and learning the opinions of others who have been watching the course of this epidemic.

Of the many names which have been proposed for this disease, such as the pest; inguinal, bubonic, glandular, oriental, pali, and levantine plague; oriental typhus; and septic pestilence, I consider plague to be the best. As the name indicates, it is a stroke—the victim is struck down, and dies. In malignant forms of fevers, such as typhus, scarlet fever, small-pox, and malaria, people are also struck down and die quickly, but malignancy is exceptional in these diseases, while in plague it is the rule. The name bubonic fever appears to me a particularly bad one, as another acute, infectious fever, characterised by inflammatory swelling of the deep cervical, the axillary, inguinal and other lymphatic glands, has already been described by Pfeiffer as glandular fever. This disease differs in other respects from plague, and most particularly in running a benign course.

Plague might be defined as an acute, infectious, specific fever, due to the presence of the plague bacillus in the tissues and blood, and characterised by enlargement of the lymphatic

glands, and sometimes by local lesions of the skin, and by pneumonic consolidation of the lungs.

There are no characteristic *premonitory symptoms*. The invasion is usually sudden, the disease being ushered in by a severe rigor. The attack frequently occurs at night, and is often accompanied by vomiting. As a rule, there is splitting headache; the *tongue* is evenly, and thinly coated white except at the tip and edges, which are red and irritable. The *bowels* are generally constipated, but not infrequently there is diarrhoea. The *temperature* rises rapidly, reaching its maximum on the evening of the second or third day, or in very acute cases, as early as the evening of the first day. The *lymphatic glands* in the femoral, axillary, or cervical regions are frequently found to be swollen, and very tender, at the time of the onset, or very shortly afterwards. Sometimes, however, they are not found until the third or fourth day of the disease, or even later. It is very tempting to connect the glands, which get enlarged in the early stage of the disease with the seat of inoculation, and they may be in some cases; but in the majority of cases this enlargement appears to be rather owing to the selection by the microbe of the lymphatic glands as its seat of growth after it has gained admission to the lymphatic or vascular systems.

As to the symptoms met with in the *nervous, respiratory, circulatory, etc.*, systems, those connected with the *nervous system* appear to be the most characteristic and most important. There is *insomnia* of the most distressing character; *intelligence*, as a rule, is unimpaired. *Speech* is affected in two ways; there is thickness of speech, similar to that caused by alcoholism, and with this there is, sometimes, difficulty in phonation. *Memory* is defective. Sometimes there is *delirium*, which is busy in character, like that of delirium tremens; more often there is *stupor*. There is some loss of *sensibility to touch*, and *hearing* is defective. There is marked loss of muscular co-ordination, as is shown by patients complaining of being unable to articulate properly, owing, as they describe it, to their tongues being heavy and unmanageable. It is also noticeable in the clumsiness with which they handle articles and in inability to walk in the direction they wish to go. There is marked loss of *muscular tone*, in many cases amounting almost to *paralysis*. The peculiar, stupid expression seen in these cases appears to be due to relaxation of the facial muscles and loss of expression.

It is owing to this that one fails to appreciate from a patient's appearance how near death he is. When one contrasts the expression of a patient dying from peritonitis, although he may be suffering from but little or no pain, with that of a plague patient within a few hours of death, one sees from the expression of the former how deadly ill he is, while the latter seems to have but little the matter with him. In some cases it is true that the sunken eyes and drooping corners of the mouth give an appearance of anxiety, but this is due to loss of tone in the facial muscles and not to a feeling of anxiety. A symptom, which is constantly present, is *congestion* of the ocular conjunctiva, most marked at the outer and inner canthus when it is relieved from the pressure of the lids. May not this train of nervous symptoms, and the loss of muscular co-ordination, and tone, be due to congestion of the nervous centres, quickly followed by *anæmia*, *œdema*, and subsequent defective nervous impulse?

The *heart's impulse*, during the first few hours after the onset, is strong, but soon grows feeble. The *area* of the apex beat, ordinarily a point which could be covered by the tip of the finger, gets increased to an inch or $1\frac{1}{2}$ inches. The *sounds* are clear though feeble, and in over 100 cases examined no murmurs were detected during the early days of the disease, except in one case, in which there were other evidences of old heart disease. The *pulse*, which is at first rapid and strong, soon grows very rapid and feeble, and finally running, from extreme diastolism. The fall in *blood pressure* seems due to vaso-motor paralysis, and feeble cardiac action; the failure of the heart's action being probably due to the direct influence of the poisoned blood on the cardiac ganglia and muscle. Congestion of the *lungs* often occurs within the first 24 hours, and is not infrequently followed by lobar pneumonia, most of which is followed by *œdema*. There is a *pneumonia* in which the pneumonia is primary and due to the growth of the plague bacillus in the lung tissue. It is generally lobular, but sometimes a whole lobe or even a whole lung, is involved. The right lung is most often affected, and the right base most affected; but patches of *œdema* may be found in both lungs. In these cases the *temperature* is irregular, running up to 105° or 106° F., falling, after 3 or 4 or more days, to 103° F. or less, only to rise again to nearly its former height, if the patient live long enough. These are the only cases I have met with in which the maximum temperature was not reached within the first day or two of the disease. The *sputum*, tough at first, becomes watery early, and contains little white purulent masses floating in it. Pain is slight, or absent, and death, as a rule, is preceded

by constant cough, and sometimes foetid expectoration. Hemorrhage from the lungs occurred in only 2 cases out of nearly 200 examined at the Arthur Road Hospital. In the *digestive system* there are pain and tenderness at the epigastrium. Nausea and vomiting are frequently met with, and sometimes diarrhoea. The *liver* is enlarged as a rule; the *spleen* but little, if at all. But I need not enter on the conditions of the *digestive and urinary systems*, as they have been gone into by Dr. Hojel. As regards the clinical division of the disease into varieties, I think a better arrangement than that at present adopted would be into (i) *Cerebral*; (ii) *Pulmonary*; (iii) *Gastro-intestinal*. (i) The *Cerebral* variety might be subdivided into (a) cases in which there is violent delirium, early cardiac failure, and death; and (b) those in which there is stupor, coma and death; the latter form being the more rapidly fatal; (ii) *Pulmonary* characterised by primary broncho-pneumonia, or lobar pneumonia; incessant, cough, with watery (but rarely rusty) expectoration. Pain slight or absent, an irregular temperature, heart failure and death; (iii) *Gastro-intestinal*, in which there is constant vomiting and diarrhoea.

Current Medical Literature.

OBSTETRICS AND GYNÆCOLOGY.

USE AND ABUSE OF ERGOT IN OBSTETRICS. (*Lancet*).—Dr. Thomas Marc Madden read a paper on the above subject before the Section of Obstetrics of the Royal Academy of Medicine in Ireland. He says that the dangers ascribed to the administration of ergot during labour include: *firstly*, its possible foeticidal effects; *secondly*, the probability of giving rise to such irregular uterine action as may occasion subsequent retention of the placenta; and *thirdly*, the direct tonic effect on the maternal system that has been attributed to this drug. From a study of 150 obstetric cases in which ergot was used, he comes to the conclusion that many of the evil effects that have been ascribed to ergot are the result of its abuse, and therefore afford no reason against its judicious employment. He, however, points out that "under no circumstances should ergot or ergotine be given during labour until the os uteri is fully dilated or so dilatable as to allow of delivery by the forceps if the child be not expelled by uterine action within an hour of its administration, or at any time sooner than this may become necessary, as otherwise the foetal circulation might very probably become arrested by the protracted tonic or unrelenting uterine action which is the characteristic effect of this drug." To use any preparation of ergot safely and effectively it is essential (1) that the presentation should be natural or cranial except in some instances of breech presentation in which it may possibly be necessary to deal at once with uterine inertia; (2) that there should be no marked disproportion between the foetus and mother, or any other physical impediment in the genital tract to delivery; (3) that the os uteri, if not previously fully dilated, should be so dilatable as to allow of speedy extraction by the forceps when necessary; and (4) that the preparation selected, the dose and the method in which it is employed, should be well calculated to produce the

required effect. Subject to the foregoing conditions, ergot may with utility be employed when actually indicated and judiciously administered either before, during or after the second stage of labour. That is to say, it may be given before the full dilatation of a dilatable os—(1) in some instances of long delay from uterine inertia in which there is imminent danger to mother or child; or (2) risk of subsequent flooding from further protraction of the case. During the second stage it may be employed (3) in labour rendered abnormally tedious by deficiency of uterine action or otherwise complicated, and in which the presentation is natural and no other impediments to delivery exist; or (4) for the prophylaxis of apparently impending flooding. During the third stage ergot may be resorted to (5) for the expulsion of the placenta when retained by inertia; or (6) for the arrest of loss of blood. After delivery this secholic may be employed either immediately; (7) to check or prevent hæmorrhage; or subsequently (8) to produce tonic or permanent contraction, and by sealing up the uterine vessels, thus lessen the liability to bacteriological invasion or sepsis; or else at the same time it may be exhibited; (9) for the purpose of expelling clots from the womb and so arresting after pains. Lastly (10), in the majority of multiparous patients ergot may be administered during the puerperal period with the object of stimulating the muscular tonicity of the uterus accelerating the process of involution.

In dealing with the method of employing ergot in obstetric cases, the author says that under no circumstances should ergot be given in obstetric practice in those small utterly inefficient and frequently repeated doses that have been recommended by several modern authorities, but which in the author's opinion are calculated to do more harm than good by producing irregular and evanescent waves of muscular contractility instead of that firm, regular and tonic uterine contraction by which alone persistent uterine inertia may be overcome, the foetus or the placenta expelled, *post partum* hæmorrhage prevented or arrested, retained clots and membranous or placental debris dislodged, and subsequent sepsis or still later sub-involution may be deviated. The author has employed each of the following preparations with advantage, *viz.*, an extemporaneous infusion of the crude freshly powdered drug, Liq. Ergotæ B. P., Long's glycerine solution of ergot, Bonjean's ergotine, Oppenheimer's ergot and B. W. & Co.'s tabloids of ergotine.

THE VALUE OF EXPLORATORY LAPAROTOMY *per se* IN (a) REAL, AND (b) SUPPOSED MALIGNANT DISEASE OF THE ABDOMINAL ORGANS (*Lancet*).—Dr. Herbert Snow read a paper on the above subject before the British Gynecological Society. He had been struck by the remarkable improvement in certain cases of indubitable

malignant disease which followed a simple incision without any further operative procedures, and thought if future explorations were scanned in the light of expected amelioration, it would be found that the peritoneum thus stimulated behaves to a certain extent as in tuberculosis. A small part of the tuberculous deposit only is removed yet the remainder somehow disappears, and the patient becomes and continues well, Dr. Snow related some cases in which there was improvement, and concluded that routine exploration should be resorted to in every case of supposed abdominal cancer for two reasons:—(a) the possibility of error; and (b) the fact that, as a mere matter of treatment, this step always improves and often materially checks the advance of the disease, permitting scope for the administration on which he placed the greatest reliance of opium with cocaine.

DELAYED EXPULSION OF SECOND TWIN. (*British Medical Journal*).—Lelarge and Verchere record the case of a multipara who aborted of a six weeks' foetus on June 12th, 1896. She rose ten days later; there was much sero-sanguineous discharge. The uterus was bulky, the os uteri patulous and sub-involution was diagnosed. The uterine cavity was swabbed with glycerine of ereosote, and this treatment was repeated eight times. The sound passed 3 inches. The discharges disappeared, and the patient made excursions in a mountain watering place. On September 2nd, the day after her return to Paris, labour pains set in, and the leg of a foetus was seen projecting from the vulva. The foetus was extracted, and it appeared to have attained the fourth month. The placenta could not be removed till four hours later. Thus the pregnant uterus tolerated the sound, eight applications of the cautery, the fatigues of a long voyage and the exertions of long walks up and down mountain paths.

CAMPHOR AS AN ANTIGOLACTAGOGUE. (*British Medical Journal*).—Herrgott finds that 9½ grains of camphor a day divided into three doses and given for three days always produce a remarkable diminution of the secretion.

A SIMPLE METHOD OF TREATING POST-PARTUM HÆMORRHAGE FROM ATONY OF THE UTERUS. (*Edinburgh Medical Journal*).—Kumpf relates how he was led by the results of experiments on animals to note the powerful effect of rapidly repeated mechanical stimuli in producing uterine contraction. It occurred to him that the same method might be applied to the relaxed uterus in post-partum hæmorrhage, and he has employed the following simple procedure in two cases with success. Standing facing the patient on the right side of the couch with the right arm held stiff, the fingers are placed on the abdomen midway between umbilicus and pubis and by a succession of rapid impacts the uterus is compressed against the spinal column. Kumpf

says it is easy to deliver thirty or forty shocks per second in this manner, and the result is prolonged tetanus of the uterine muscle. When the uterus becomes fairly contracted the procedure is changed, and the operator, standing with his back to the patient and passing the fingers behind the uterus, compresses it now against the pubis, and thus delivers his shocks upon the posterior uterine wall. In this way powerful contractions lasting several minutes are elicited, and the procedure can be repeated if necessary. The author claims for the method that it is simple, harmless, rapid, and requires no instruments.

KEDARNATH DAS, M.D.

Vital Statistics & Sanitation.

EXTRACT FROM THE ANNUAL REPORT OF THE CHEMICAL EXAMINER AND BACTERIOLOGIST TO THE GOVERNMENTS OF NORTH-WESTERN PROVINCES AND OUDH AND OF THE CENTRAL PROVINCES, FOR THE YEAR 1896.

PART II—BACTERIOLOGICAL.

MICROCOCCUS.

(Continued from page 23S.)

A CLUE to the proximate cause of the outbreak was furnished by the only other case of cholera that occurred in cantonments at the time. The patient was a servant of one of the guests, and had been employed in the mess on the occasion of the dinner party in question. He was a Madrassi and could eat European food. Such food could not be eaten by the other servants who were not Madrassis. The Madrassi servant was attacked on July 15th, the same day as the other victims and died on the same day. It was discovered that he had eaten the remains of a chocolate pudding that had been left over from the dinner. He had not eaten any of the tinned prawns or any other food so far as could be ascertained. That the outbreak was not due to the more ordinary channel of drinking water was proved by the fact that all the servants in the mess drank from the single well that was in the mess compound, and that with the above exception they all remained in good health; further the mess was provided with a Pasteur filter, and few of the members ever drank water. Consequently the investigation threw strong suspicion on the chocolate pudding. At this stage of the investigation Mr. Hankin was called in to see whether the bacteriological test could throw any light on the mode of access of cholera microbes to the chocolate pudding, and on the reason why in this position these microbes exhibited such exceptional virulence.

A bacteriological examination of everything in the mess house and mess kitchen that was met resulted in the discovery of the cholera microbe in a fully virulent condition in an unexpected position. Such care was being taken, and had been taken, in the sanitation of the kitchen, that all drinking water was not only boiled but passed through a Pasteur filter. The cholera microbe was found in a *degchie* of recently boiled water that was standing near the Pasteur filter ready to be poured into it. The water coming from the Pasteur filter was free of cholera microbes. The original water-supply whether taken direct from the well or from the blist's *mushak* was found to be free of infection. There is every probability that the water in the *degchie* had really been boiled, a process which obviously would remove any microbes that might be present, since after a severe outbreak such obvious precautions are not usually neglected. No one had in all probability introduced the infection by taking water out of the *degchie* by means of an infected vessel, because the *degchie* was still quite full of water at the time when it was examined by Mr. Hankin. It was not likely that the infection had been introduced by means of flies, because the lid was on the *degchie*, and probably had been there since the *degchie* had been removed from the fire. The only remaining channel by which the water in the *degchie* was likely to have become infected was the dish cloth used in carrying it from the kitchen to the pantry. If the dish cloth were infected with cholera microbes,

the latter might be introduced into the water contained in the *degchie* by this water splashing up against the dish cloth.

Investigation showed that the clean dish cloths on their return from the wash arrived impregnated with cholera microbes. The mess dhobie was in the habit of washing the dish cloths in a running stream two miles and a half from cantonments, in whose water no cholera microbes could be detected. Surgeon-Captain Marks, who investigated the matter, found that it was highly improbable that the dish cloths had become infected owing to their having been washed in the same vessel as cholera-infected clothing, both because the dhobie did not use any vessel, but only the running water, and because, so far as could be learnt, he only worked for the mess and for a few Europeans who had remained in good health.

For some time the source of infection of the dish cloths escaped detection, but at length Surgeon-Captain Marks found that during May and June, that is to say during the few weeks before the outbreak in the mess, five or six cases of cholera had occurred in some huts situated about 30 yards from the place where the dhobie washed. The drainage from these huts went in the direction of the river, and at length the cholera microbe was detected in sand from near the bank of the river at the place where the dish cloths were usually laid out to dry.

Though other sources of infection are by no means excluded, the above is the only way by which virulent cholera microbes may have been introduced into the mess at the time of the outbreak in favour of which any positive evidence can be brought forward.

Assuming that at the time of the outbreak cholera microbes were present on the dish cloths, it is obvious that the chocolate pudding or its constituents may have been infected by any of the vessels used in its preparation having been cleaned by these dish cloths. There is another more direct way in which the infection may have been introduced. Every cook possesses a piece of muslin through which he strains all sauces, custard, blane-manges, &c. As will be shown below, the constituents of the chocolate pudding had been strained through such a piece of muslin.*

The question now arises, why should chocolate pudding be such a dangerous nidus for cholera microbes? An answer to this question may be obtained from a consideration of the method of making it, and of the properties of its constituents. Roughly speaking, it is made as follows:—

First the contents of a packet of a gelatine are dissolved in warm water. The cook then adds to it milk, sugar, and the whites of several eggs. The constituents are well beaten up together, and then strained through a piece of muslin. The mixture is next divided into three portions. To one powdered chocolate is added to produce a brown colour; cochineal is added to the next portion, and the third portion is flavoured with essence of vanilla, possibly in order to remove the taste of the cook's fingers. A mould is placed in ice. A part of the still warm chocolate-coloured portion is poured into the mould. When it has set, some of another coloured portion is added. When this has set, more is added, and so on until the mould is full. Thus a pudding of opaque jelly in different coloured layers is produced. This is obviously a long process, during which the portions that are not set in the mould are kept at a warm temperature, such as tends to aid the growth of microbes for several hours. From the above examination of the constituents, it is obviously likely that the chocolate pudding will be a good breeding place for cholera microbes, and it is possible that the large percentage of attack in the present instance was due to cholera microbes having been swallowed in enormous quantities. In order to test this possibility, it was obviously necessary to obtain the constituents in a sterile condition, and then to add a measured quantity of cholera microbes, and estimate their rate of reproduction. So far as the milk and eggs were concerned, it was necessary to obtain them in a sterile condition without the aid of heat, as boiling might possibly affect their nutritive value. In order to do this some milk was obtained from a disinfected cow by means of a disinfected milk-fresh egg was removed through a hole in a portion of the shell that had been calcined in a blow-pipe flame. These two liquids were added to some previously sterilized and dissolved gelatine in a test tube. The mixture was inoculated with a trace of cholera microbes, and it was then found that about 20,000 of these microbes per c. cm. were present. Mr. Hankin initiated the cook in keeping the mixture in a warm place, by putting the test tube in an incubator. On the following day the cholera microbes had reproduced at such a rate that 9,000,000 were present in every c. cm. This rate

* "I was unable to obtain this particular piece of muslin for examination, because on the occurrence of the outbreak the cook had been dismissed. He had then gone to Naini Tal, taking with him his muslin. A few days after his arrival in Naini Tal there was another dinner party cholera outbreak, but no connection between this and the newly arrived cook and his muslin could be traced."

of reproduction was not quite so much as Mr. Hankin had expected for chocolate pudding, he suspected that he had made some mistake in the culinary part of the experiment. This he was fortunate enough to detect. He had used the ordinary laboratory gelatine that he used for cultivating microbes. The cook had used the specially purified gelatine that is sold for making jellies and similar food for invalids. He thereupon repeated his experiment, but used the shop gelatine instead of the other. The cholera microbe was again inoculated, and this time the cholera microbes reproduced with such amazing rapidity that 18 hours later no less than 400,000,000 cholera microbes were present per c. cm. The explanation of the difference in the results of the two experiments is extremely simple. The ordinary coarse gelatine that was used in the first experiment is acid in reaction. The other constituents of the chocolate pudding are alkaline or neutral. The mixture has a faint acid reaction. Cholera microbes are hindered in their growth by the presence of even minute quantities of acid.

Refined gelatine and isinglass that are used in making jellies and puddings, on the other hand, are alkaline, and hence, with the other constituents, make an alkaline an excellent food medium for the cholera microbe. Fortunately for us, by far the greater portion of our food has a faint acid reaction. The above-mentioned constituents of chocolate pudding are the only things commonly used by cooks that have an alkaline reaction.

Consequently this little research suggests an explanation of the excessive virulence shown by the cholera microbes in the chocolate pudding. The unfortunate partakers at the dinner party were swallowing cholera microbes that were actively reproducing and that were present in enormous quantities. The investigation also gives us a valuable hint as to how to avoid such accidents in future. In the present condition of cooks and cook-houses in India, it is almost impossible to prevent the microbes of enteric fever or cholera from being introduced occasionally.

Mr. Hankin goes on to say: "What I believe can be done is to avoid pampering these unwelcome visitors. Cold puddings made in the above described way with gelatine or isinglass should obviously be avoided. In Indian cantonments, if cholera microbes are not about, the enteric microbe is usually not far off, and these cold puddings are as likely to be able to nourish one microbe as the other.

"Ordinary transparent jellies are probably less dangerous than opaque jellies, not because they are not capable of supporting the life of dangerous microbes, but because while being made they have to be boiled after the addition of white of egg, in order to clarify them. The boiling will destroy any cholera or enteric microbes present, and as these jellies are likely to be strained while hot, they are the less likely to be infected from the flannel bag or cook's loin cloth that is used for the purpose.

"During the present summer, what I believe to be an exceptional number of European officials and military officers have succumbed to cholera and enteric fever in India. Within a few weeks of the above related outbreak in Sangor, cases were reported in the papers from Aligarh, Jhansi, Naini Tal, Kathgodam, Murree, Delhi, Agra, and other places. In one of these cases the cholera microbe was detected by me in the finger bowls, in another case the enteric microbe occupied this position. In another case the cholera microbe was found in a virulent condition in each of the vessels of water kept in the kitchen for culinary purposes. In most of the cases, however, to the best of my knowledge, the investigation had to be carried out without bacteriological help. During the same time, as far as cholera is concerned, British soldiers have been remarkably free from infection. To the best of my knowledge, in the whole of the Bengal command during the present rainy season, cases of cholera among soldiers have only been reported from two stations, and in one at least of these places the infection appears to have been contracted while the men were on the march. I believe this remarkable immunity of the British soldier, as contrasted with the relative liability of the British officer and civilian official, is due to the strenuous efforts now being made by officers of the Army Medical Staff to sanitize the soldier's cook-houses.

"The kitchens in India most in need of reform are those attached to the officers' messes of British regiments. These are private institutions not subject to official control. It is high time that officers of the Army Medical Staff should be invited to undertake the task of sanitating these kitchens. It will, I think, be clear from the facts described in this paper, that the complete prevention of cholera is rapidly becoming a matter for specialists.

"Though in many cases so far as he himself is concerned, the British officer can only be stimulated into sanitary zeal by attendance at a long series of funeral parties, his care of the soldiers under his charge is altogether admirable. As an example I may quote the following incident: A few cases of enteric occurred among the privates of an artillery detach-

ment. Every possible precaution was at once adopted. Vigorous investigation was at once begun to find the source of the infection. All sorts of things were sent to me for examination. At length I discovered the enteric microbe in water taken from the tap of an iron cistern in the battery aerated water factory. Observations made at the time tended to show that the water coming from the piped supply that was daily poured into the cistern was free of enteric. Apparently a temporary infection of the water in the cistern had occurred. But why had it persisted? The help of the Medical Officer in charge of the battery was invoked. On failing to find any obvious reason for the persistency of the infection by questioning the attendants in the factory, he had the cistern emptied.

"At the bottom and attached to the exit pipe he found a small filter. It was one made by a well-known firm of aerated water machine manufacturers, the use of which is now strictly forbidden, and the existence of which had been overlooked when these filters had been abolished. It was found afterwards that the public water-supply had been temporarily infected with the enteric microbe. The Medical Officer who investigated the matter is of opinion that the presence of this filter is a probable reason why the consumers of aerated waters from this factory suffered relatively more severely than did other bodies of troops in the station? This case appears to be an apt illustration of the capacity of ordinary filters to act as breeding places for microbes.

"As the ordinary Mess President attempts to improve his kitchen, he is likely to do more harm than good. For instance, he will issue orders that the floor is to be washed every day, instead of once a week. Under existing conditions, cleaning kitchens in Upper India is a dangerous process. Native cooks in general are of rather low caste and low standing; hence they are apt to stand on what little dignity they have and consider it beneath them to clean the floors of kitchens in which they work; consequently the sweeper has to be called in to do the business. In Upper India there are no sewers. The sweeper is a man who fulfils the functions of a sewer; he is apt to carry about outside him what sewers in other countries carry about inside them—namely, dangerous microbes. I have elsewhere published an account of a very clear case in which I proved that the sweeper was introducing cholera microbes into the cook-house because of his methodical habit of reserving one broom for clean work, such as sweeping out barracks, and another broom for dirty work such as cleaning out latrines and cook-houses. Those who know India will agree with me that stopping this abominable custom may not be so easy as it appears on the surface.

"Both in the present paper and elsewhere I have given examples of the dangers attending the washing of dish cloths in India. I doubt whether in the whole of India there is a Mess President or Club Secretary who has a reasonable certainty that his kitchen dish cloths are not washed with water infected with either cholera or enteric microbes. Unless the Mess President can arrange for the sterilization of washed dish cloths, it might be wiser to leave them dirty."

In addition to the investigations already mentioned, a large amount of work has been done in connection with a search for a cholera-killing microbe in the Jumna water, and in investigating the plague microbe including the bacteriological examination of a case of bubonic plague that occurred in Agra, regarding which a separate report has been submitted to the Inspector-General of Civil Hospitals through the Civil Surgeon, Agra, and to the Sanitary Commissioner. In the latter part of May, Mr. Hankin visited Amritsar to examine the proposed water-supply. The results of this examination are contained in a published report No. 653, dated 21st August 1896, from Mr. Hankin to the Secretary to Government, Punjab, Public Works Department.

I have been most ably assisted in the large amount of work that had to be done by Dr. Ghadially by whom the technique of many of the experiments noted in this report has been carried out.

Resolution on the Report of the Lahore and Delhi Lunatic Asylums for the year 1896 received with the letter from the Inspector-General of Civil Hospitals, Punjab, No. 1534, dated the 15th of April 1897.

REMARKS.—This Report which was due in the Civil Secretariat on the 15th April was received on the 17th idem.

* "My having been suddenly sent to Bombay in connection with the bubonic fever outbreak is the reason why I have been unable to obtain definite figures with regard to this case. The above is the opinion of the Medical Officer who carried out the investigation."

† See "Cholera in Indian Cantonments," Pioneer Press, Allahabad.
‡ See the Annual Report of the Chemical Examiner and Bacteriologist to the North-Western Provinces and Oudh for 1895.

2. The number of inmates in the Lahore Asylum at the end of the year was 233 (185 males, 53 female), or 17 (13 males, 4 females) more the number in the institution at the commencement of the year, viz., 221.* The total population was also larger by 19 in 1896 than in 1895.† On the other hand, it is noticeable that, unlike the year 1895 when the daily average strength (233.09) exceeded the number of inmates (221) at the end of the year, the daily average strength of 234.96 in 1896 was less than the number of inmates (138) on the 31st December in that year. It was also less than the daily average strength of the year 1895 and less by 14.89 than the daily average strength of 249.76 for the past ten years. The total percentage of discharged cured to admissions was 33.63 as against 50.63 in 1895. The percentage to daily average strength was, however, much the same in both years, viz., 16.17 in 1896, as compared with 16.80 in 1895. The unusually large percentage recorded in 1895, coupled with the large number of re-admissions in that year, induced the remark in the review of the report for that year that perhaps sufficient care was not taken in discharging lunatics as cured, and the Inspector-General of Civil Hospitals was asked to enquire into the matter and submit the result for information. It is now reported that the Superintendent never discharges any patients except those who have appeared to be sane and have shown tendencies for several months, and that he persons who have apparently recovered, because (1) the surroundings of any asylum must be prejudicial to permanent recovery, and (2) on account of the unhealthy character of the Lahore Asylum itself. As shown above, the percentage of cured in 1896 closely approximated the figures for 1895, the actual number of discharges cured for the two years being 38 and 40 respectively. It, however, appears that no re-admissions occurred among the 38 discharged in 1896, and that out of the 10 actual re-admissions of patients discharged in previous years no less than 7 had enjoyed periods of sanity varying from 11 to 2 years. In these circumstances His Honor is disposed to agree with the Inspector-General that sufficient care has been taken in discharging patients as cured. With reference to the allusion to the unhealthiness of the Asylum, it may be here noted that the question of the construction of a Central Asylum for the Punjab is still engaging the attention of Government. Under the orders of the Lieutenant-Governor a special Conference, composed of the officers noted on the margin,‡ has reported on the matter, and it is probable that, funds permitting, the construction of a new Asylum to contain the patients of both the Lahore and Delhi Asylums will be commenced at no distant date.

* Males	172
Females	49
1895 { Males	253
Females	62
Total	315
1896 { Males	262
Females	72
Total	334
Increase	19

years, viz., 16.17 in 1896, as compared with 16.80 in 1895. The unusually large percentage recorded in 1895, coupled with the large number of re-admissions in that year, induced the remark in the review of the report for that year that perhaps sufficient care was not taken in discharging lunatics as cured, and the Inspector-General of Civil Hospitals was asked to enquire into the matter and submit the result for information. It is now reported that the Superintendent never discharges any patients except those who have appeared to be sane and have shown tendencies for several months, and that he persons who have apparently recovered, because (1) the surroundings of any asylum must be prejudicial to permanent recovery, and (2) on account of the unhealthy character of the Lahore Asylum itself. As shown above, the percentage of cured in 1896 closely approximated the figures for 1895, the actual number of discharges cured for the two years being 38 and 40 respectively. It, however, appears that no re-admissions occurred among the 38 discharged in 1896, and that out of the 10 actual re-admissions of patients discharged in previous years no less than 7 had enjoyed periods of sanity varying from 11 to 2 years. In these circumstances His Honor is disposed to agree with the Inspector-General that sufficient care has been taken in discharging patients as cured. With reference to the allusion to the unhealthiness of the Asylum, it may be here noted that the question of the construction of a Central Asylum for the Punjab is still engaging the attention of Government. Under the orders of the Lieutenant-Governor a special Conference, composed of the officers noted on the margin,‡ has reported on the matter, and it is probable that, funds permitting, the construction of a new Asylum to contain the patients of both the Lahore and Delhi Asylums will be commenced at no distant date.

(To be continued.)

Review and Notice of Book.

ROUGH NOTES ON REMEDIES. BY WM. MURRAY, M.D., F.R.C.P., LONDON. 2nd Edition, 1897. H. K. Lewis: London, pp. 104, cr. 8vo. Price 3s. 6d.

THE rapid sale of the first edition of this little work within six months has necessitated the publication of the second edition. It consists of papers which have appeared in the pages of *The Lancet* and *The Northumberland and Durham Medical Journal*. The subjects treated are Arsenic in Chorea, Diabetes and Asthma; Belladonna in Renal Calculi, Dysmenorrhœa, Painful Defecation, Obstruction of the Bowels and Typhilitis; Mercury in Heart Disease; Calomel in large doses; and Nitrate of Silver in Epilepsy. The object of the author has been to draw attention to the fact that the action of some very old-fashioned remedies is by no means to be regarded as exhausted of all their virtues by previous research, and that further investigation should be followed by others who have time, opportunity, and experience. The author gives illustrative cases to show the effects of the drugs used. A remarkable case of dilated and hypertrophied heart treated by 20,000 grains of blue pill is mentioned. The man recovered from advanced cardiac

dropsy, and had ten years of good health. The papers are prefaced by a brief introduction and concluded by a chapter on "our mistakes."

We can fully assure our readers that the contents of this little work are well worth republication and are full of practical instructions.

Correspondence.

LIGATURE OF THE EXTERNAL ILIAC ARTERY FOR ELEPHANTIASIS.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—In your issue for May last, pages 197 and 198, is a letter from Surgeon-Lieutenant-Colonel Maitland, M.D., condemning the operation of ligaturing the external iliac artery for elephantiasis as unjustifiable because it was abandoned long ago, and giving other reasons justifying his opinion.

His letter was evoked by the report of the case which I published in your issue of February last, where I mentioned the ligature of the external iliac artery on the 15th February 1896, in a patient of mine who came to me for medical relief as he found it difficult to follow his occupation as a cultivator with the elephantiasis he suffered from. One can imagine the discomfort of driving a plough in the hot sun of the North-West Provinces and Ondh over sun-baked soil, and how the unhappy owner of such a growth would be if there was the least chance of relief, especially as elephantiasis is not a common disease in the North-West Provinces; and his neighbours who were free from it, would naturally excite his envy. Surgeon-Lieutenant-Colonel Maitland would very rightly have judged of the operation of ligature of the external iliac artery as a formidable one; but to have expressed so decided an opinion as to say it was unjustifiable because it is supposed to have been abandoned long ago, I do not agree with.

He also quotes the mortality which followed the operation from a list of operators whose names are familiar. I think, however, that it would perhaps have been better to have given the dates or approximate dates, the locality and the features of his cases, especially Eppner's 49 cases which were followed by five deaths, giving a mortality of 10 per cent., also whether the case of these individuals was European, mixed or Natives of India.

We know how operations of a formidable character have been abandoned and considered unjustifiable in the pre-historic age, and how they have once more been revived since that great father of antiseptic surgery has conferred so great a boon on humanity which has brought him fame and a Peerage so well deserved, and which the whole of the medical profession rejoice to know. Such formidable operations as ovariectomy have been as discouraging in the beginning; but in the hands of the young surgeon at the present day of antiseptic surgery, how many operations of this nature have been robbed of the dreadful fear which existed in bygone days. Even the public are more sanguine of our success, and buoy us up with hopes when they know and see the marvels—nay miracles of antiseptic surgery. If the great Liston and Fergusson could but wake up and see the wonderful achievements of the young surgeon and microbiologists, their praise and admiration would be beyond measure.

A great author on tropical diseases tells us with regard to elephantiasis arabum, that "there can be no doubt that this disease gives rise to most remarkable out-growths and necessitates most formidable surgical operations, which in the majority of cases are followed by the happiest results, and are often the only treatment to which it is amenable."

As to the Etiology or Pathology of the Disease, the discoveries of men like Lewis, Bancroft, Manson, Sarsino, Dos Santos and Crevand have done much towards giving an impetus; but we are now living in an age of microbiologists armed with their powerful microscopes whose researches are still being carried out with as much zeal and energy in their search after the truth.

Surgeon-Major Havelock Charles of Calcutta has recently read a paper before the Calcutta Medical Society on the 13th of January 1897, on the subject of elephantiasis scroti, and he states that the filaria of the disease were frequently sought for by Dr. Drury, the Pathologist, with negative results, and that his examinations do not bear out Manson's opinion that all forms of tropical elephantiasis are due to the presence of "Filaria Nocturna," that in no instance was this parasite found, and on no occasion was his "Filaria Bancrofti" discovered.

Sir Joseph Fayrer, who is no mean authority on tropical diseases and whose name to this day in India is a household

word, tells us, that the ordinary form of elephantoid hypertrophy may occur independently of chyluria hæmazon or any obvious change in the lymphatics. I should say that this is frequently the case, especially in sporadic forms, especially in parts of India where this disease is not commonly recognised as endemic.

It seems to me that in those days of microbiology, which is carried out with such zeal and energy, that the practical surgeon either has not the microscopic eye of his ancestors, that our instruments are possibly defective or too well constructed, or, that the object of our search keeps out of our way, having grown either too leary because of the increase of such sporting gentlemen, or scarce as the *ovis poli* which the sportsman only accidentally comes across on the snowy heights when he has no weapon in hand.

It is the old and well-known tradition when you wish to see your game you never have the chance: but when you do not go prepared you see him by "the million."

Happy is the man who is well armed when the filaræ do appear—some are born under a lucky star and manage to see them whenever they are there.

In my case which I reported in your issue of February last, the patient was a strong, healthy-looking individual of the cultivator class in the climate of the North-Western Provinces and Oudh. He put his case before me and prevailed upon me to operate, and he was more sanguine of my success and his recovery as I told him than I myself was, but he insisted upon the operation being done, and so it was undertaken under as strict antiseptic precautions as possible, and the patient went away pleased, and came again six months after to see me, still looking as happy as punch and very greatly improved, and in fact he said he would soon be quite himself. He walked several miles from his home to see me, and stated that he did not feel that weight and dragging of the limb as before.

As to the justifiableness of any operation in addition to the above reasons, I quote Mr. Stanley Boyd's, M.B., B.S., LOND., F.R.C.S., ENG. "For Barbadoes Leg" (one of the many synonyms for elephantiasis arabum), "ligature of the femoral or external iliac artery has been done with a good deal of success, this failing, as it often does, amputation only remains, and this at present is the only treatment for elephantiasis seroti." *Vide* 12th edition, Druitt's Surgeon's Vade Mecum. One more point about this disease, *viz.*, that Mr. Vincent Richards found in Orissa that 6-29 cases of elephantiasis arabum had also the *Græcorum* form. I merely mention this because Madras being along the same Coast line, possibly the cases which Surgeon-Lieutenant-Colonel Maitland considers unjustifiable for operative interference are identical with the above, if so, I most heartily endorse his opinion; but if not, I still maintain my ground. Of course in operating upon such a case, I would certainly prefer to do so in the climate of the North-Western Provinces and Oudh in preference to many other parts of India.

TURA, ASSAM,
The 7th June 1897.

G. H. FINK, *Surgn.-Major,*
Indian Medical Service.

Appointments, Leave, &c.

MEDICAL.

The furlough on medical certificate, out of India, granted to Surgeon-Captain J. Murray, M.B., I.M.S. (Bengal), Professor of Materia Medica and Pathology in the Lahore Medical College, in the Notification in this Department No. 3, dated the 4th January 1897, is extended by one month.

The services of the undermentioned officers are replaced at the disposal of the Military Department, with effect from the dates on which they respectively made over charge of their duties under the Government of the North-Western Provinces and Oudh:—

Surgeon-Captain J. Mulvany, I.M.S. (Bengal).
Surgeon-Captain E. H. Condon, M.B., A.M.S.

BENGAL.

Surgeon-Lieutenant-Colonel J. M. Zorab, Civil Surgeon of Bhagalpur, is appointed to be Civil Surgeon of Cuttack, *vice* Brigade-Surgeon-Lieutenant-Colonel C. J. W. Meadows, retired.

Surgeon-Captain J. T. Calvert, Civil Surgeon of Mymensingh, is appointed to be Civil Surgeon of Bhagalpur, *vice* Surgeon-Lieutenant-Colonel J. M. Zorab, but will continue to act as Inspecting Officer for the purpose of carrying out the provisions of the Epidemic Diseases Act, 1897, at Khana Junction, East Indian Railway, until further orders.

Surgeon-Captain C. E. Snider, Officiating Civil Surgeon of Rangpur, is appointed to act as Civil Surgeon of Bhagalpur, during the absence, on deputation, of Surgeon-Captain J. T. Calvert, or until further orders.

Assistant-Surgeon Bihari Lal Pal, supernumerary at the Medical College Hospital, Calcutta, is appointed temporarily to have medical charge of the civil station of Rangpur, until further orders.

Surgeon-Major F. A. Rogers, Civil Surgeon of Bogra, has been granted by Her Majesty's Secretary of State for India an extension of furlough for four months on medical certificate.

Second Class Military Assistant-Surgeon P. Fitzpatrick, Officiating Medical Officer at the Sandheads, is confirmed in his appointment, *vice* Second Class Military Assistant-Surgeon J. C. Gillmon.

Surgeon-Captain H. A. Benymman, Army Medical Staff, is appointed to have charge of the civil medical duties at Barrackpore, in addition to his own duties, during the absence, on leave, of Surgeon-Major A. Keogh.

Surgeon-Captain Jay Gould is appointed to be an Inspecting Officer for the purpose of carrying out the provisions of the Epidemic Diseases Act, 1897, at Khana Junction, East Indian Railway, with effect from the 15th March 1897.

Dr. C. Banks, Civil Medical Officer of Puri, is appointed to be Protector of Emigrants and Superintendent of Emigration, Calcutta, with effect from the afternoon of the 15th May 1897.

INDIAN SUBORDINATE MEDICAL DEPARTMENT.

To be Senior Assistant-Surgeon with the honorary rank of Surgeon-Lieutenant.

First Class Assistant-Surgeon John Davis, Bengal Establishment. Dated 23rd December 1896.

The Queen has also approved of the retirement from the service of the undermentioned officers:—

INDIAN MEDICAL SERVICE.

Brigade-Surgeon-Lieutenant-Colonel Hugh Johnstone, M.D., Bengal Establishment. Dated 9th April 1897.

Surgeon-Lieutenant-Colonel Alexander Kenneth Stewart, Bombay Establishment. Dated 31st March 1897.

Surgeon-Lieutenant-Colonel Edward William Young, Bombay Establishment. Dated 1st May 1897.

Surgeon-Major Donald Frederick Dymott, Madras Establishment. Dated 14th May 1897.

INDIAN SUBORDINATE MEDICAL DEPARTMENT.

Senior Assistant-Surgeon, with the honorary rank of Surgeon-Major, William Fearn, Bombay Establishment. Dated 12th January 1897.

Acknowledgments.

JOURNALS RECEIVED.

Lancet—British Medical Journal—The Practitioner—Edinburgh Medical Journal—American Journal of Obstetrics—Dublin Journal of Medical Science—Archives of Gynecology and Obstetrics—Manual of Gynecology and Padiatry—Therapeutic Gazette—Provincial Medical Journal—The Journal of the American Medical Association—New York Medical Journal—Medical Record, New York—Boston Medical and Surgical Journal—Times and Register, London—Abstract of Sanitary Reports, United States—Occident—Bulletin of Advanced Medicine—Surgical Reporter—The American Journal of the Medical Sciences—Medical Chronicle—Times and Register—Sanitary Record—Medical Press and Circular—La Tribune Medicale—La Reforma Medica—Gazette Hebdomadaire—South Russian Medical Gazette—Archives Cliniques de Bordeaux—Gesundheitsrat—Montreal Medical Journal—Dietetic and Hygienic Gazette—Toledo Medical Compend—The Bristol Medical-Chirurgical Journal—Pacific Medical Record—Le Mercredi Medical—Annales de La Polyclinique De Lille—United Service Gazette—Indian Medical Record—Indian Medical Reporter—Indo-European Correspondence—Indian Medical Chirurgical Review—O. Archivio Medico da India, Goa.

BOOKS AND PAMPHLETS RECEIVED.

Notes on Micro-organisms Pathogenic to Man. By Surgn.-Capt. B. H. F. Leumann, I. M. S.

COMMUNICATIONS RECEIVED.

Surgn. Capt. R. H. Elliott, Madras.—Surgn.-Lieut.-Col. Joubert, Calcutta.—Surgn.-Major Fink, Assam.—Dr. W. D. Sutherland.—Surgn.-Major D. G. Crauford, Monghyr.—Surgn.-Capt. J. W. Pilgrim, London.—Surgn.-Capt. D. M. Moir, Calcutta.—Dr. Kedar Nath Das, Calcutta.—Brig.-Surgn.-Lieut.-Col. McLeod, London.—Surgn.-Col. Bainbridge, Karachi.—Surgn.-Capt. L. Rogers, Lucknow.—Dr. W. P. Esmond White, Tuvardin.—Mildred Staley, M. D., Delhi.—Surgn.-Capt. T. E. Dyson, Bulsar.

Original Communications.

SOME CURIOSITIES IN COMMA BACILLI OF ASIATIC CHOLERA.

By SURGN.-CAPT. J. C. VAUGHAN.

THERE is nothing new under the sun, and in offering what follows I have no intention of posing as having discovered new things. I only wish to dwell for a little on the interest which attaches to that which is curious among things with which, in their usual aspects, we are all more or less familiar.

One reads of comma bacilli and "comma bacilli," and occasionally reads or hears of proposals to examine all the tank waters in Bengal for these organisms, and perhaps one may expect to find "comma bacilli" in a good many out-of-the-way places. But since I began to gather materials together for this paper I have often wondered whether the comma bacillus of cholera in its wild and untamed state plays as many chameleon tricks, as it appears capable of doing in the laboratory. Sanarelli, writing in the *Annales de L'Institut Pasteur*, says: "Il est tout à fait démontré qu'en l'absence de toute épidémie cholérique on peut trouver, les eaux plus ou moins contaminées par les vibrions tout à fait identiques à ceux auxquels on attribue le rôle essentiel dans l'infection cholérique." And his argument here we may admit at once as just, viz., that whereas cholera bacilli are comma bacilli it does not follow that all comma bacilli are cholera bacilli. But it happens not infrequently that, while working with organisms grown direct from Asiatic cholera and about whose identity there is no reason to entertain any doubt, one meets with variations in their form which make it practically impossible to recognize them as comma bacilli of any kind whatever. It is a few instances of this kind that I would bring forward here, not as any thing new, but merely as possessing a certain interest, and as illustrating the polymorphism shewn and the quaint disguises at times assumed by one which out here in India at least ought to be numbered among the most familiar of our microbe acquaintances. And before going further let me at once acknowledge the ready, willing and valuable help I have had from Assistant Surgeons G. C. Mukerji and S. B. Banerji in getting together the materials illustrating this communication.

In the course of the usual daily routine of preparing material for anti-choleraic inoculation, it was discovered one day that the passage tube received that morning from Calcutta was impure. Fortunately, enquiry at the Post Office, that same evening, put us in possession of a passage tube from the Calcutta Health Office and this one proved pure. About 8 P.M., I inoculated tubes from this for the next day's

afternoon operations, but as we had already lost some ten hours of the time required for growth of the cultures, I decided to force the growth somewhat, and accordingly set my incubator at about 40° c. for the night. The parent passage tube had lain in the cold all this time before the forcing, and the cultivations next morning all proved pure cultures. This was now Monday, the 18th January 1897. No passage tube could arrive from Calcutta now till Tuesday morning, and as tubes were required for the inoculations to be done on Tuesday, I was obliged to use one of these pure cultures (just mentioned), and, selecting the best grown, used it instead of a passage tube, inoculating from it seven tubes to be used for Tuesday's inoculations. This was done on Monday afternoon the 18th, and as the day was a cold one the cultures were put into the incubator at 37° c. Monday night proved cold, and as experience has shewn that the incubator we use here tends to fall at night as the temperature lowers, I raised it to 40° c. at about 11 P.M. On Tuesday morning the 19th I found the temperature at 42° c. and the tubes very well grown. But on examination of what were very carefully made cultivations from a tube very carefully examined and found pure, not one of the former could be passed, as containing nothing but normal forms of comma bacilli, and Figs. 1 and 2 represent the growths in two of the tubes as shewn under the microscope. I decided that these were nothing but overgrown cholera bacilli, but as the variations in form rendered it absolutely impossible to detect contaminations, I decided also not to use them for inoculation, but to watch them. Accordingly zig-zag cultures were made immediately on examination on Tuesday the 19th from tubes 4, 6, and 7, and, for these, material was picked up with the sterilized bristle from the exact points from which it had been taken up for the specimens figured in Figs. 1 and 2. In the figures I have only shewn the results in tubes 6 and 7, but the whole series of seven tubes shews the same kind of thing. Figs. 3 and 4 shew the change in tubes 6 and 7 after being allowed to stand at the temperature of the room till next day, and Figs. 5 and 6 shew the result of the zig-zag cultures after 24 hours' growth, i.e., on Wednesday the 20th January. The specimens figured in Figs. 3, 4, 5, and 6 were examined together, and all had stood at the temperature of the room, i.e., about 20° c. in the day, and about 16° or 17° c. at night or even lower.

A reference to the figures will at once shew the remarkable changes in the bacilli from the rank fantastic growth in Monday's tubes to the normal culture examined on Wednesday. The change from Monday to Tuesday, as shewn in Figs. 1 and 2 and 3 and 4 was merely the result of placing the growing tubes at a lower temperature. The zig-zags were made from tubes 6 and 7 when they were in the condition

shewn in Figs. 1 and 2, that the four Figs. 3, 4, 5 and 6 represent the change between the examination on Tuesday 19th and Wednesday. Examining them closely one sees not only that they are very similar but that they shew traces of the original rank growth, and these traces are more marked in the original tubes (Figs. 3 and 4) than in the cultures from them (5 and 6). The drawings are very carefully made to bring out the points herein noted. Figs. 9 and 10 shew a much magnified view of the curious forms shewn in Figs. 1 and 2, and it is interesting to note not only the great diversity of form and actual size but also the fact that the staining (alcoholic-solution of Gentian violet 5 per cent. in 5 per cent. carbolic acid and water) is not evenly taken up by all parts of the organism, portions being only very lightly stained or not stained at all, and in some instances curiously suggestive of what has erroneously been taken for a process of spore formation. If nothing else, the curious shapes of these unstained patches would entirely negative any supposition in favour of their being spores. Flüggé speaks of the dying bacteria losing their form, shrivelling up, or swelling out, and in such a state taking up the colouring matter only slightly or not at all. In this case, however, we have the micro-organisms certainly not dying but growing beyond their normal growth and with extraordinary rapidity and readily yielding cultures. Farther on the Wednesday some of the original tubes which had reverted to the state shown in Figs. 3 and 4 were used for inoculations, and their reactions were quite normal in the cases inoculated (compare here also Van Ermenegen's figures).

The normal measurements of a typical comma bacillus are given as varying between 0.8 m. to 1.5 m. in length, the breadth or thickness varying from $\frac{1}{5}$ to $\frac{1}{3}$ of the length. This measurement of thickness could, however, ordinarily hold only in the case of bacilli of short or medium length, and not in the case of those as long as 1.5 m. which are usually proportionately thinner. But the curiosities figured in Figs. 1, 2, and in 9 and 10 measure from 0.5 m. to 24.5 m. in length and in width from 0.2 m. to 1.4 m. The proportion between length and thickness or breadth being pretty well anything you please and varying often within remarkably wide limits in the same organism.

One could scarcely wish for a more graphic illustration of polymorphism, as exemplified in the contents of a single tube or from a single series of cultivations of proven purity at each end of the observations made on them. Normal comma bacilli inoculated on Monday morning into perfectly sterile tubes, were never the same things to look at for any two hours of the next 48, at the end of which period they (in Fig. 3), and their descendants (Fig. 5) had again resumed their old normal form, while to the naked

eye there was never any difference in appearance from one day to another.

Pass on next to Fig. 7. These were taken again from a passage tube which arrived on the Tuesday on which the preceding curiosities were noted, and the first examination of this tube, which was labelled 19th January 1897, shewed its contents in the condition figured in Fig. 7. The bacilli here have been very carefully drawn to shew exactly the variations in shape and marking. Here we have bladder-like dilatations and indeed a remarkable range of variety both in shape and marking. In some of these the remarkable fineness of the contour line where it is thin, and the manner in which here and there a thin contour line stained violet merges into a broader portion of stained substance in the body of the microbe almost makes one inclined to suggest that these unstained spots are vacuolations or at any rate degeneration spots of some kind.* In still older cultures one often sees a mixture of granules and bacilli, which seem to have lost their clearness of outline. But in this particular specimen and in many others that have passed through our hands we have noticed this curious vacuolation and that it seems to pervade pretty well the whole culture. And yet, Fig. 8 shews the result of inoculating a tube from such a preparation, and the same thing will be obtained if a guinea-pig be inoculated instead of an agar tube. Here again although one is inclined to entertain the idea of degenerations in the bacilli, yet their descendants grow with a vigour which goes far to remove any aspersions on their ancestry.

Pass on again to Fig. 11 and 12 and here we have a still more extreme instance of change in the appearances assumed by the good old classical "comma."

In both these he looks, in field after field, like nothing that is either fish, flesh or fowl; more like amorphous granular detritus, which stains indistinctly; and what is more, in the two tubes from which the figures are taken, he actually refuses to grow on good agar. Certainly the temperature was maintained at about 100°F. for the better part of the day in the workroom, and as there was no means of cooling the place, perhaps the heat was too much for him when kept up at that height. So, thinking that perhaps a little stimulation and better nourishment might improve matters, I transferred the contents of these two tubes into the peritoneal sac of a small guinea-pig in the usual way, and in about seven hours obtained the culture shewn in Fig. 13. These tubes, figured in 11 and 12 were passage tubes inoculated direct with peritoneal serum in the

* This appearance must not be confused with the peculiar blister-like distortion shewn in parts of bacilli which have been overheated in fixing. These same appearances (as in Fig. 7) were obtained after fixing in the flame, and also after simple slow drying in the open air.

first week in April, and they were inoculated in the second week in May into the guinea-pig from which we obtained the specimen in Fig. 13, so that they were over a month old and had been laid by for the purpose of tracing changes in the bacilli. But though examined very frequently they never at any time shewed more than just a very few "vacuolatio" bacilli, while from about their fourth day they shewed the beginning of their peculiar granular condition, which, though slightly marked at first, came eventually to shew the characters figured in Figs. 11 and 12. One of my Assistants declared they were dead, but the sequel to inoculating the guinea-pig shewed that, though "corpsed" by the heat perhaps, they were still very much alive and kicking, and the fact that they refused to grow on agar at first only pointed to their having been probably starved too long to subsist further on ordinary rations. But Fig. 13 shews clearly what we were dealing with in Figs. 11 and 12 and curiously enough a little coaxing of the growth at a temperature of nearly 100° F. produced again a series of growths as figured in Fig. 14, growths very similar to those shewn in Figs. 9 and 10, only not so highly magnified. With a little waiting these again assumed the normal comma type, and I would only be multiplying figures indefinitely if I were to attempt again to delineate the changes. The specimens from which these figures have been drawn are now in my possession, and I shall be glad to shew them to any one wishing to see them, and indeed I have already shewn them to one or two. So much then for the actual specimens figured. I will only add that I think that those who have seen the original slides with me will bear me out when I say that the specimens put under the microscope look even more extraordinary than my pictures of them, and I have farther been able so often to reproduce these curiosities, practically at will, that I do not hesitate to figure them. There is nothing new in polymorphism in comma bacilli, and the varieties figured in this paper have been produced, excepting those in Fig. 7 by nothing more than changing the temperature from the normal range of that in which cholera bacilli are grown to a higher range, and doing it comparatively suddenly.

The curious shapes assumed (Figs. 9 and 10) appear to depend on a great hastening of the ordinary process of fission, by which cholera bacilli multiply and, indeed, in some cases it would almost appear as if the bacilli budded as well as divided. The simple symmetrical S-form may be taken as one in which two commas symmetrically related at the point of division have not yet separated; but some S-forms are not symmetrical, and if such divisions with resulting segments in a symmetrical relation be indefinitely multiplied we can account for some of the curious forms, like Chinese letters, which

often occur. What is more difficult to account for is the enormous thickness and length of the forms figured in Figs. 1, 2, 9 and 10.

The question next arises—Do comma bacilli in any of these extraordinary forms ever occur in nature? And it is a question which for the present I am unable to answer; but, whether they do or not, the ease with which they are led back from aberrant forms to the normal or recognized type of comma growth, would seem to indicate no real difficulty in an ultimate diagnosis. For all that, however, it has occurred to me that the great variety of forms which the comma bacillus may assume are so numerous and interesting that it would, perhaps, not be amiss to place on record at least a few of the variations one may meet with in the laboratory.

ABDOMINAL SURGERY AT THE EDEN HOSPITAL CALCUTTA, DURING THE YEARS 1894, 1895 AND 1896.

By BRIGADE-SURGN.-LIEUT.-COL C. H. JOUBERT, M.B. (LOND.), F.R.C.S.

Obstetric Surgeon, Medical College, Calcutta.

My last series of cases was published in the *Indian Medical Gazette* during the year 1894; the present shows the work of the past three years, less a period of seven months, during which I was on furlough.

The same system of classification has been adopted as in former reports, and similar tables have been prepared. The general results for the two and a half years may be epitomised as follows:—

Ovariectomy	{ Ovarian cysts	.. 17 cases	.. 2 deaths.
	{ Parovarian cysts	.. 4 "	.. 1 "
Hysterectomy for fibromata	.. 10	"	.. 4 "
Do. Porro's operation	.. 2	"	.. 1 "
Removal of uterine appendages for inflammatory conditions	.. 7	"	.. 1 "
Removal of uterine appendages for uterine fibromata	.. 4	"	.. 0 "
Removal of ovarian hydrocele or tubo-ovarian cysts	.. 1	"	.. 0 "
Removal of pedunculated cystic fibroid and appendages	.. 1	"	.. 0 "
Laparotomy for various other conditions (result of operation)	.. 17	"	.. 4 "
		63 cases	13 deaths.

The percentages of mortality* in these operations are as follows:—

Ovarian cysts	.. 2 deaths in 17 cases	= 11.76%
Parovarian cysts	.. 1 " 4 "	= 25%
Hysterectomy	.. 4 " 10 "	= 40%
Oophorectomy	.. 0 " 4 "	= 0%
Removal of appendages for inflammatory conditions	.. 1 " 7 "	= 14.3%
Laparotomy for various other conditions	.. 4 " 17 "	= 23.5%

Most cases of laparotomy present interesting features, but the above list is too long for any

* This mortality, however, has been reduced to 18.1% in the cases (11) operated on up to date of this report from January 1895.

but a brief abstract of some of the more interesting cases to be given. The tables show the chief points relating to the whole of the cases.

OVARIAN TUMOUR.

The two deaths were both of Europeans.

Case No. 4.—A German had a left ovarian cyst with a good pedicle, no adhesions, amount of fluid 44 ozs., and a right broad ligament (parovarian) cyst burrowing deeply by the side of the uterus, and containing 56 ozs. of fluid. Both were removed without difficulty. The parovarian cyst was shelled out, and the edges of the sac stitched to the abdominal incision. The cavity was packed with iodoform gauze. Vomiting set in eight hours after the operation and became incessant, only moderating on the 5th day, when the patient had become very violent, restless and troubled by hallucinations. The condition continued very serious, though vomiting had ceased, and death occurred on the 9th day after the operation. The daily temperatures ranged between normal or subnormal, and 101.04 is the highest noted. On the 5th day the pulse rate rose and ranged till death between 130 and 160. No *post-mortem* examination could be obtained, and the actual cause of death was doubtful. The wound remained aseptic; there were no signs of peritonitis or chest complications; there was free secretion of urine. I am inclined to think death was due to iodoform poisoning from the gauze used to stuff the sac of the parovarian cyst.

Case No. 11.—a European—presented two large ovarian cysts adherent behind and above the uterus: 340 ozs. of cyst fluid were measured, but a considerable quantity was lost. The uterus was quite embedded between the cysts, and to their walls were adherent the cæcum, the rectum, the sigmoid flexure, besides much omentum. The separation of all these serious adhesions was most tedious and difficult; portions of the cyst wall had to be left on the gut in places, but in the end good pedicles were secured. A glass drainage tube was left in, removed after 48 hours, and replaced by a gauze drain. On the 3rd day the abdomen was closed. There was some hiccough and yellowness of the conjunctivæ, retching and vomiting of dark brown fluid. The urine became scanty and smoky in colour, 8 ozs. only every six hours being removed by the catheter. The temperature rose to 102°4, the pulse to 120, and there was great restlessness. Death took place on the 4th day. No *post-mortem* examination could be obtained, but the symptoms pointed to disease of the kidneys.

Case No. 12.—In this case the sub-peritoneal fat and tissue were very thick and vascular, and the apex of the empty bladder was cut into at a point half-way between the pubes and the umbilicus, after the peritoneum had been opened. The peritoneum was quite $\frac{1}{8}$ of an inch thick and almost cartilaginous. The opening in the

bladder was closed by a continuous catgut suture, and some of the thickened sub-peritoneal tissue sewn over the closed incision. The accident to the bladder gave no trouble during convalescence, which was normal. A curious feature was noticed in this case. When first and subsequently examined before operation a peculiar crepitating sensation was conveyed to the hand palpating the abdomen, like that due to emphysema, and such as described in books as due to adhesions. The cyst proved to be entirely free from adhesions. It was extremely multilocular, and when removed after tapping the main cysts, was still large from the very numerous minute cysts. On palpating the mass the same crepitant sensation was observed as through the abdominal walls.

Case No. 15.—In this case the bulk of the fluid, 410 ozs., was free in the abdominal cavity. It was of thick colloid character. The patient had been originally admitted into the Medical College Hospital and was there tapped. As only a few drops of "mucoid matter" were removed, she was transferred to the Eden Hospital as a case of ovarian disease. It is probable that the contents of the cyst escaped into the abdominal cavity through the tapping puncture.

Cases No. 5 and No. 14 were of elderly women of 65 and 56 years of age respectively, both being many years past the menopause. Both made excellent recoveries.

PAROVARIAN CYSTS.

Case No. 4, of these, which ended fatally, was a very formidable one. On opening the abdomen 150 ozs. of ascitic fluid escaped, and the intestines were found rough and deeply congested with recent peritonitis. The cyst was in the right broad ligament and had burrowed behind and to the left of the uterus, completely filling the pouch of Douglas. On its upper and posterior surface were adherent coils of intestine. It contained 100 ozs. of clear fluid and masses of papillomatous matter. The lower or pelvic portion was connected with the upper by a constricted opening. It was found impossible to shell out the cyst wall. The edges of the opening in the cyst were therefore sewn to the lower part of the abdominal incision and the cavity packed with iodoform gauze, round a glass drainage tube.

A good deal of sanious fluid was removed from the tube on the first two days—8 ozs. and 7 ozs.—and the patient was very low and restless, with a subnormal temperature and rapid pulse. The tube was removed, and gauze changed on the 3rd day, but the condition continued very bad, and death occurred on the 5th day.

In July, 1895, I removed two small cysts from a patient, which proved to be of the interesting variety hitherto called "Tubo-ovarian cysts," but to which Bland Sutton, in his *Surgical Diseases of the Ovaries and Fallopian Tubes* (1896)

has given the more correct name of "ovarian hydrocele." The ovary in the nulliparous woman lies in a kind of sac or recess on the posterior aspect of the broad ligament. The abdominal end of the Fallopian tube falls over the mouth of this recess and conceals the ovary. In some of the lower animals the recess is a complete sac in which the ovary lies, and into which the Fallopian tube opens. It resembles in fact the tunica vaginalis of the male. As the case is of interest, I give it with rather full details.

A Bengali woman of 30 was admitted in June, 1895, complaining of incontinence of urine and urethral pain, also of passing blood on straining. By bi-manual examination both appendages were found enlarged, movable and cystic. Uterus movable, sound entering 2," normal direction. The posterior wall of the bladder appeared rough to the sound.

The urethra was dilated under chloroform, and the bladder examined, but nothing abnormal was found. An operation for the removal of the appendage was proposed and was agreed to.

On opening the abdomen by a 5" incision a large cyst was found deep down behind and below the uterus on the right side and a smaller one less deeply situated on the left side. It was difficult at first to make out the nature of these cysts, but on dealing first with the one on the left side and breaking down numerous adhesions, the ovary was identified, and the cyst found to be between it and the end of the Fallopian tube. It was brought up with difficulty and tapped, about 1 oz. of clear fluid escaping, a pedicle was secured and tied, and the parts removed. The larger cyst was then examined. It was embedded in Douglas' pouch and continuous with the posterior wall of the uterus, and appeared to be a broad ligament cyst. It was raised out of the pelvis with difficulty and tapped, 3½ ozs. of similar fluid escaping. On passing the finger into the collapsed cyst it did not appear to burrow between the layers of the broad ligament but to be applied to its poste-

rior surface. Under the presumption that it was of similar nature to the one on the left side, the ovary was sought for in the adhesions and dug up from the bottom of Douglas' pouch. The remains of the cyst were then peeled off the back of the uterus, and a good pedicle formed and secured.

On examining the parts removed each was found to consist of ovary, a thin cyst and portion of a slightly dilated Fallopian tube. The tube in each case opened into the cyst by a small smooth opening, the ovaries being on the walls of the cysts and being flattened and atrophical. The case was a typical one of the kind called ovarian hydrocele by Bland Sutton, the cysts having developed from the recess or sac above alluded to, the margins of which had become glued together by plastic inflammation.

With regard to case No. 4 (ovarian series) where death seemed to be due to iodoform poisoning, I have now seen five or six distinct cases of iodoform poisoning, one being a case of amputation of the breast where cellulitis occurred leaving a large granulating surface. In only one case did death result, but the symptoms were very serious. In all the symptoms became marked in the course of three or four days. There was very unstable temperature, varying daily from 97° to 104°; very rapid weak pulse 120 to 160; great restlessness and delirium of maniacal kind, incessant shouting and hallucinations. The symptoms slowly subsided on changing the dressings, but normal condition only returned after two or three weeks. The large raw cavities packed or granulating surfaces covered with iodoform must offer too great a surface for absorption of the drug. I used the new antiseptic izar with marked benefit in one case, and I propose to use gauze prepared with izar in future in all such cases, as it is non-poisonous, and appears to have greater antiseptic properties than either carbolic acid or perchloride of mercury, both of which are contraindicated for stuffing cavities.

No.	Date of operation.	Age.	Condition of children.	Length of incision.	Adhesions.	Ovary removed.	Amount of fluid contents and weight of sac.	Highest temperature after operation.	Result.	Name and race.	Duration of disease.	REMARKS.
1	17th Jan. 1894.	35 M.	0 para.	3½"	Parietal and omental.	Both	... 300ozs. Sac= 1 lb. 9 ozs.	100.2° on 6th day.	Cure	Golab, Bengali Hindu.	10 years.	Multilocular cyst.
2	24th	..	22 M.	3 para.	3½"	Omental ...	Right ... 240 ozs. and colloid matter=37ozs.	Sac Normal ...	Cure	Kamardini, Bengali Hindu.	1 year	Multilocular cyst.
3	3rd Mar. 1894...	24 S.		3½"	Omental and general.	Both	... 3½ozs. from both. Sacs weighed about 1½ ozs.	101° on 2nd day.	Cure	Gaynor, Eurasian.	Doubtful	Both cysts were dermoid containing hair and cheesy matter.
4	13th June 1894	40 M.	0 para.	4"	None	... Left ovary cystic. Right broad ligament cyst.	Left 44 ozs. Sac 1½ ozs. Right 56 ozs. Sac 2½ ozs.	101.4° on 4th day.	Death	Seltzer, German Jewess.	Doubtful	Death from incessant vomiting. Ovarian cyst unilocular.

No.	Date of operation	Age, and number of children.	Condition of incision.	Adhesion.	Ovary removed.	Amount of fluid contents and weight of sac.	Highest temperature after operation.	Result.	Name and race.	Duration of disease.	REMARKS.
5	22nd Aug. 1894	65 M. 18 para.	4"	Omental ...	Left	... 156 ozs. Sac	109° on 2nd day.	Cure	Bensley, English.	1 year ...	Multilocular cyst.
6	19th Dec. 1894	28 M. 2 para.	3½"	Universal.	Right	... 20 ozs.	100° on 3rd day.	Cure	Patterson, English.	4 months	Twisted pedicle, cyst unilocular.
7	19th	25 M. 0 para.	4"	Universal.	Left cystic, Right hy-drosal-pinx.	16 oz.	101° on 2nd day.	Cure	Tasselli, American.	Doubtful	Unilocular cyst.
8	5th Jan. 1895 (a private case.)	19 M. 1 para.	4"	Parietal, omental and intestinal.	Both	cyst 360 ozs. from right side.	Normal..	Cure	—Bengali Hindn.	7 months	Multilocular cyst.
9	30th Jan. 1895 (a private case.)	28 M. 1 para.	3½"	Omental...	Right	... 72 ozs. Sac = 1 lb. 2 ozs.	100° on 2nd day.	Cure	—Eurasian	Noticed after confinement 3 months ago.	Unilocular cyst.
10	23rd Feb. 1895.	40 M. 3 para.	6"	General, of all kinds.	Not noted.	Tenaceom colloid contents, amount not noted.	100° on 3rd day.	Cure	Aleman, Hindu s-tani Mahomedan.	7 months	Multilocular cyst.
11	6th Mar. 1895.	37 M. 2 para.	4"	Of all kinds and very formidable. The rectum and sigmoid flexure, buried between two adherent cysts.	Both, the two cysts adherent to each other.	340 ozs. Left sac = 1 lb. 15 ozs. Right sac = 7 ozs.	102° on 2nd day.	Death on 4th day.	Watling, European, C.B.	3 years ..	Unilocular cysts, kidneys diseased.
12	14th May 1895.	40 M. 0 para.	4"	None	Right	... 136 ozs. Sac = 1 lb. 7 ozs.	102° on 5th day.	Cure	Suja Mukhi, Bengali Hindu.	1 year ...	Multilocular cyst, bladder accidentally cut into.
13	19th June 1895.	24 M. 3 para.	4"	Parietal and omental.	Both, cyst from left side.	264 ozs. Sac = 13½ ozs.	100° on 2nd day.	Cure	Chandra, Bengali Hindu.	8 months	Unilocular cyst.
14	27th Nov. 1895.	56 M. 4 para.	4"	None	Left	... 474 ozs. Sac = 1 lb 14 ozs.	98° on 1st day.	Cure	Sadler, Eurasian.	3 years ...	Multilocular.
15	4th Mar. 1896 .	30 M. 1 para.	5"	Numerous	Right	... 410 ozs. Sac = 6 ozs.	100° on 5th day.	Cure	Alokasi, Bengali Hindu.	Doubtful	The bulk of the fluid colloid was free in the abd. cavity, cyst multilocular.
16	28th Mar. 1896.	25 M. 1 para.	4"	None	Both	... Right cyst = 36 ozs. Right sac = 1 oz. Left cyst = 2 ozs. Left sac = ½ oz.		Cure	Mona Jugan, Bengali Mahomedan.	10 months	Double cysts one multilocular.
17	4th Apr. 1896...	33 M. 2 para.	3½"	None	Right	... 100 ozs. Sac = 7 ozs.	100° on 2nd day.	Cure	Herbert, English.	1 year ...	Multilocular.
<i>Parovarian Cysts.</i>											
1	10th Jan. 1894 .	25 M. 0 para.	4"	Pelvic	Left	...	...	Cure	Khoti, Bengali Hindu.	4 months	Barrowing cyst, sac shelled out.
2	17th Jan. 1894 .	35 M. 0 para.	3½"	None	Left, but right ovary and tubo also removed.	8 ozs. Sac = ½ oz.	100° on 21st day.	Cure	Allahadi, Bengali Hindu.	6 months	Do.
3	1st Aug. 1894...	48 M. 4 para.	4"	Omental, intestinal and parietal.	Right, but left ovary and tube also removed.	40 ozs. Sac = 3½ ozs.	100° on 6th day.	Cure	Jamni, Bengali Mahomedan.	Doubtful	R. ovary suppurating.
4	30th July 1895.	27 M. 0 para.	4½"	Intestinal and pelvic.	Neither	... 100 ozs.	101° on 2nd day.	Death	Kamini, Bengali Hindu.	5 months	Ascitic fluid = 150 ozs.
<i>Tubo-Ovarian Cysts or Ovarian Hydrocele.</i>											
1	10th July 1895.	30 M. 0 para.	4"	Pelvic	Both	... Right = 3½ ozs. Left = 1 oz.		Cure	Saroda, Bengali Hindu.	Doubtful.	

UTERINE MYOMATA.

In ten cases between March 1894 and April 1896 the uterus and tumour were removed by laparotomy with four deaths, the organ removed weighing from 3 to 14 lbs. In all the serrenœud was used, the stump being treated extra peritoneally. To shut off the stump from the peritoneal cavity, a needle threaded with silkworm gut is passed through a fold of the peritoneum of the anterior abdominal wall, then through the peritoneum at the back of the remains of the uterus below the serrenœud and then through a similar fold of peritoneum on the opposite side. On tightening the suture a collar of peritoneum embraces the stump below the serrenœud. A continuous suture of chromic catgut is then used to bring the edges of the peritoneum together starting from the silkworm gut suture. The serrenœud and stump then lie entirely outside the general peritoneal cavity. Deep silkworm gut sutures, transfixing the whole thickness of the abdominal walls are of course also used, and latterly I have also sutured the aponeurosis above the recti muscles for the whole length of the incision with stout catgut.

The above mortality of 40 per cent. is too high, but it has been reduced to under 20 per cent. in my later work.

Case No. 1 was difficult of diagnosis. There was a moderate sized, very movable apparently cystic tumour in the right lower abdomen, reaching to within two fingers' breadth of the umbilicus. The sound entered only $2\frac{1}{2}$ ", the uterus being apparently below and distinct from the tumour. Menstruation was irregular, lasting four to five days, and sometimes being absent for one or two months. The tumour proved to be a soft myoma growing from the fundus uteri. The Fallopian tubes emerged from the uterus quite low down in the pelvis and the serrenœud had to be applied *above* them. Both tubes were cystic and adherent in Douglas' pouch. They with the ovaries were separately tied off and removed. The patient did very well till the 4th day when she became noisy, restless and sleepless, with a temperature of 100 to 102° and weak rapid pulse. There was no tympanitis or evidence of peritonitis; the bowels acted well, and the stump remained sweet. There was no vomiting, but the urine became suppressed 30 hours before death, only $\frac{1}{2}$ an ounce being secreted in that time. No *post-mortem* examination obtainable.

Case No. 2 also presented some difficulties of diagnosis apparently. I was absent on short leave when the case was admitted, and the officer replacing me noted that the abdominal tumour presented "the usual signs of an ovarian cyst;" the sound entering only 2", and the uterus lying below the tumour, distinct fluctuation being present. The history given, however, was of a tumour having been noticed for seven years, that menstruation, though scanty and irregular pre-

viously, had been profuse for the last five months. The sound entered $4\frac{1}{2}$ ", the point being felt in the tumour. The mass was irregular in shape, and elastic rather than fluctuating. It appeared to me to be a soft myoma of the uterus. On opening the abdomen, the irregularities of shape were found to be caused by three cords stretching over the front of the tumour, being respectively the round ligament, the Fallopian tube, and the ovary and its ligament. The condition was unusual and singular. The base of the tumour was very broad and burrowed below the peritoneum of the right iliac fossa to the level of the crest of the ilium. An elastic ligature and a loose serrenœud wire were placed on the base of the tumour as low down as possible, and a circular incision made round the tumour some inches above the ligature. A good deal of watery fluid escaped in gushes from the incision into the tumour. The mass was rapidly enucleated and removed; the elastic ligature being tightened, as the tumour rose up out of its bed. The patient's condition was good after the operation. The tumour weighed 13 $\frac{3}{4}$ lbs. even after the escape of much fluid. It was a soft myoma, full of numerous large veins. On the second day frequent vomiting set in, becoming incessant, with great restlessness. The temperature rose gradually to 106.4° shortly before death on the 3rd day. There was no tympanitis, the abdomen remaining quite flat. A *post-mortem* examination showed entire absence of peritonitis or sepsis. The right base of the tumour had invaded the mesentery of the ilium near the cæcum and had obliterated it. A little bit of ilium, which was in the covering of the base of the tumour, not the whole circumference of the gut, had been included in the grip of the serrenœud. This no doubt caused the vomiting which proved fatal to a weak patient.

Case No. 3 was also interesting from a diagnostic point of view. There was no history of menorrhagia, and menstruation had been absent for 11 months. Three months before admission the patient had noticed a tumour on each side of lower abdomen. The abdomen was irregularly distended, below the umbilicus by a tumour of half the size of an adult head, above by a pyramidal extension reaching nearly to the ensiform cartilage. On the right side it felt cystic, behind and to the left solid. The sound entered 4". The diagnosis was doubtful between a rapidly growing soft myoma and a multilocular ovarian cyst. On opening the abdomen a white cyst-like tumour was exposed, over which the peritoneum lay loosely; no adhesions, but a very broad base with intestine on it. A fine trocar passed in drew off no fluid, so the abdominal wound was enlarged, and the tumour brought out. The rectum and sigmoid flexure were on the lower part behind and the bladder drawn upon the front. The tubes were

given off near the apex. The base was almost as broad as the greatest circumference, and it was very difficult to apply the elastic ligature without including bowel or bladder. A circular incision at mid height of the tumour caused the mass to start upwards out of its bed, the peritoneum with gut behind and bladder in front retracting and slipping down. The loosened elastic ligature could then be tightened clear of both bowel and bladder. I have always found this to occur in these broad based tumours. As soon as the tight capsule is freely incised, the tumour extrudes itself, and the elastic ligature slips lower down, becoming of course loose. I always tie it with *half* a knot, securing the ends with a pair of T-forceps. These can be quickly taken off, and the rubber tube forming the ligature rapidly tightened, and again secured in a few seconds, during which there is rarely any loss of blood. The tumour after removal weighed about 6 lbs. and was a soft myoma.

The abdomen became much distended by tympanitis 18 hours after the operation with much pain, anxious aspect, respirations 56. Magnesia sulphate in one drachm doses was given every half hour, till 3 ozs. had been taken without effect, but a glycerine enema then produced three copious stools, with immediate and permanent benefit.

Case No. 5 presents some points of interest. The tumour had been noticed for three years. At first there was menorrhagia, but latterly the menses had been scanty. The chief troubles were from pressure, respiration and the action of bowels and bladder being much interfered with. The tumour filled the abdomen from pelvis to ribs. The vagina was drawn up into a little slit behind the pubes, with cervix out of reach. The sound passed in till the point was felt on the left side above the umbilicus, only half the handle remaining external to vulva. The base of the tumour filled two-thirds of the pelvis. The patient's general condition was very bad, but she was anxious to be operated upon.

On opening the abdomen and getting the tumour out, the bladder was found to reach half-way up the front of the tumour. It had of necessity to be included in the elastic ligature till the circular incision was made round the tumour. The front covering of the tumour could then be stripped down, freeing the bladder, when the rubber tube was again tightened. A serrencœd wire was then loosely applied, and the tumour enucleated and cut away. On defining the limits of the bladder by a sound, a portion was found to be gripped by the loose serrencœd wire. A second one was applied higher up above the bladder, and the first wire removed. The tumour was an ordinary hard fibroid and weighed 14 lbs. In one place was a cavity the size of a foetal head at term, containing an encysted mass of decolourised blood clot. The patient did well for two days, but became restless on the 3rd night

and died on the 3rd day; only 14 ozs. of urine were drawn off during the first 48 hours, but shortly before she died she passed 16 ozs.

The *post-mortem* examination showed no peritonitis or free fluid in the abdomen and a healthy stump. Both ureters were dilated and the left was tortuous. The right kidney was double the natural size, the left very small with but little cortex. Both were congested. The right ureter was quite free, but the left, though not in the grip of the wire, was kinked up into an acute angle by the wire though not absolutely obstructed. Its mucous membrane was healthy. The wire had gripped the cervix just above the remains of the external os. Death appears to have been due to partial suppression of urine from chronic kidney disease, and recent congestion.

The next four cases presented no point of particular importance and made good recoveries.

Case No. 10 was a very troublesome one, from the fact that the tumour grew from the right side of the uterus and burrowed beneath the peritoneum lining the entire pelvis from which it was enucleated leaving an enormous cavity. The incision round the tumour just cut through the top of the uterus, and it was impossible to apply a serrencœd without leaving a large sac beyond it. To arrest bleeding from the cut surface of the uterus, a silkworm gut ligature was passed round it subperitoneally, but the Paquelin cautery had also to be used, and one large bleeding vessel tied. The edges of the cut capsule were then stitched to the lower part of the abdominal wound, and the cavity packed with iodoform gauze. The tumour weighed 6½ lbs. and was a hard fibroid. Obstinate and continued vomiting set in soon after the operation and continued till death on the second day after.

The next four cases, including a private case not operated on in hospital, were of double oöphorectomy for fibroids. In all the tubes and ovaries were buried in adhesions deep in the pelvis below the tumours, and had to be dug out with difficulty. All were successful.

The last *Case No. 14* on the list was an interesting one. The woman had noticed a tumour for two years, but menstruation was scanty and regular. The tumour reached from pelvis to 2" above umbilicus, and was fluctuating in places and hard in others. Before it came into my hand, it was diagnosed as an enlarged spleen and an ovarian tumour on account of a marked sulcus between the left and right portions.

The connection between the two portions, however, appeared to me to be too broad and thick to justify the above diagnosis. The uterus was small and moveable below the tumour, the sound entering 2½" only. The condition appeared to be one of double ovarian tumour adherent to each other, the left one being more solid than the right.

On opening the abdomen, a yellowish white tumour was exposed looking like an old ovarian cyst, with a median vertical constriction. The lower portion, the hard part, was attached by a thick pedicle to the fundus of the uterus. The upper portion of the right side of the mass was cystic and continuous with the left which was solid. There was no connection with the spleen (normal size). There were very extensive and vascular, soft omental adhesions. The trocar drew off 60 ozs. of coffee-coloured fluid from the cystic part, and the rest of the tumour was then drawn out of the abdomen. A Staffordshire knot was first applied to the pedicle, but the compression was not sufficient, so it was replaced by a locking figure of eight ligature. Before tying this, however, a circular incision was made round the base of the tumour an inch above the ligature; to relax the tissues, the tumour was then cut away. As the ovaries were small and hard, and both tubes cystic and occluded, the appendages on both sides were removed. The tumour weighed $5\frac{1}{2}$ lbs., and contained a large

amount of caseous material as well as the cyst mentioned. The solid part was of ordinary fibroid nature. The patient made a good recovery.

In the cases of hysterectomy the serrenced wire was removed, as a rule, from the 12th to the 16th day, but lately I have been removing the wire much earlier on the 4th to the 6th day, as soon as the stump is evidently strangulated. Also I have given up tightening it after the first day. There appears to be less extensive sloughing from below the wire, if it is removed early, and not tightened daily as was formerly recommended. In several cases the incision through the uterine or cervical canals failed to close, and a sinus persisted from the abdominal wound to the vaginal cavity. I have found that the best way to cause the sinus to close was by passing a dozen horse-hairs through the sinus and out at the vulva, knotting them round the pubes. By removing two or three hairs every few days the sinus closed completely in about 12 or 15 days.

CASES OF UTERINE FIBROID TREATED BY OPERATION. EDEN HOSPITAL, 1894, 1895 and 1896.

No.	Date.	Age.	Condition and number of children.	Length of incision.	Nature of disease and duration.	Nature of operation.	Result.	Name and race.	REMARKS.
1	14th Mar. 1894 ...	32	M. 3 abortions.	4"	Soft myoma. Appendages diseased. 5 years.	Hysterectomy..	Death..	Kristodoni, Bengali Hindoo.	About 4 lbs.
2	6th June 1894 ...	40	M. 1 para.	9"	Soft myoma. 7 years.	Ditto	Do.	Gara, Ooriah ...	Tumour weighed 13 $\frac{3}{4}$ lbs.
3	19th Sept. 1894...	40	M. 1 para.	4"	Soft myoma. Doubtful history.	Ditto	Cure	Babooti, Bengali Hindoo.	Tumour weighed about 6 lbs.
4	28th Feb. 1895...	36	M. 0 para.	6"	Soft myoma. 8 years.	Ditto	Cure	Matoe, Bengali Hindoo.	Tumour weighed 5 lbs. 3 ozs.
5	21st Aug. 1895 ...	30	M. 0 para.	10"	Hard myoma becoming cystic. 3 years.	Ditto	Death	Bedhu, Bengali Hindoo.	Tumour weighed 14 lbs.
6	28th Aug. 1895 ...	43	M. 1 para.	6"	Hard myoma. 15 years.	Ditto	Cure	Mrs. C., Bengali Hindoo.	Tumour weighed 2 lbs. 14 ozs.
7	18th Mar. 1896 ...	40	M. 0 para.	6"	Hard myoma with suppurating foci. 1 $\frac{1}{2}$ years' history.	Ditto	Do.	Rahimun, Bengali Mahomedan.	Tumour weighed 7 lbs. 13 ozs.
8	21st Mar. 1896 ...	46	M. 1 abort..	8"	Large, hard fibroid. Doubtful history.	Ditto	Do.	Mrs. H., Eurasian.	Tumour weighed 8 lbs.
9	25th Mar. 1896 ...	40	M. 1 para.	8"	Large, hard fibroid. 3 years' history.	Ditto	Do.	Srisundari, Bengali Hindoo.	Tumour weighed 6 lbs. 7 ozs.
10	1st April 1896 ...	25	M. 1 abort..	2"	Large hard fibroid. Doubtful history.	Ditto	Death	Nasibun, Bengali Mahomedan.	Tumour weighed 6 lbs. 8 ozs.
11	15th Dec. 1894 ...	46	S.	4"	Small fibroid. Doubtful history.	Ovaries and adherent tubes removed.	Recovery	Miss K., European.	
12	26th June 1895...	30	M. 1 para.	1"	Small fibroid. Doubtful history.	Ditto	Do.	Mrs. N., European.	
13	28th Sept. 1895...	37	M. 3 para.	3 $\frac{1}{2}$ "	Small fibroid. 2 years' history.	Right ovary and both tubes removed.	Do.	Mrs. D., European.	The left ovary could not be reached: the tumour was embedded in pelvis.
...	25th Nov. 1895 ... (private case)	38	M. 0 para.	4"	Small impacted fibroid. 3 years' history.	Ovaries and adherent tubes removed.	Do.	Mrs. C., European.	
14	16th Nov. 1895 ...	34	M. 1 para.	6"	Pedunculated fibroid with cystic degeneration. 2 years' (?) history.	Removal from uterine attachment. Both ovaries and tubes removed.	Do.	Lakhi, Bengali Hindoo.	Amount of fluid in cystic portion = 60 ozs. Weight of tumour $5\frac{1}{2}$ lbs.

DISEASED APPENDAGES.

Case No. 3 had been operated on by me in May 1893, when a left parovarian cyst and hydrosalpinx were removed. The right appendages were examined at the time and found to be normal. She came again to hospital in February 1894 with a ventral hernia through which a distended right Fallopian tube and a cystic ovary fixed in the pelvis could easily be made out. The woman's health being very poor, she was fed up for six weeks before operation. On opening the abdomen a dilated hypertrophied right tube and small cystic ovary were found and removed, and the separated edges of the recti brought together by silkworm gut sutures which were cut short and buried. The peritoneum was of course stripped away from the free edges of the recti, and it was separately sewn up by a continuous catgut suture.

Case No. 4 was an interesting one of double pyosalpinx. She had been under my care for three years before the operation which was performed one year after marriage. Previous to marriage I had treated her for two years for a very chronic endometritis. She aborted at three months after marriage, and I curetted the uterus for retained decidua causing hæmorrhage. She was again curetted by some one else a month or two later, and after many months of ill health was admitted into hospital in March 1894, about a year after marriage. Under chloroform the right ovary and tube were distinctly felt, movable and not enlarged. To the left of the uterus a dilated left tube, the size of a large plum, was felt. Three weeks later, after a short absence from hospital, the right cul was found to be filled by an inflammatory mass, adherent to the uterus. The left tube was unchanged and very tender.

On opening the abdomen the omentum was found adherent to the contents of the pelvis. Both tubes were greatly enlarged, thickened and adherent to surrounding tissues. With the ovaries they were freed and removed. The left tube with contents weighed just under 2 ozs., the right $1\frac{1}{2}$ ozs. Both tubes were full of pus, not offensive. The ovaries were enlarged and disorganised.

The patient made a normal recovery. About $3\frac{1}{2}$ months afterwards she passed a thick silk ligature per vaginam, which must have been from one of the stumps of tubes, and have made its way into the uterus.

Case No. 5 was also an interesting one, which I had under my observation for 10 months previous to operation. When first seen in October 1893, the right half of the pelvis was filled by a hard immovable tender mass, pushing the uterus over to the left. For three months previously she had suffered from much pelvic pain, irritation of the bladder and irregularity of the bowels. The rectum was not encroached upon. She came into hospital in December, 1893, when both right and posterior culs were found

to be filled by hard exudation, reaching to the level of the anterior superior iliac spine. The urine contained much pus. While in hospital pus also was passed daily per rectum from 4th to 8th December, after which the mass decreased in size. From this time onwards I saw her frequently at her home. The pelvic mass varied in size, and frequently pus was passed per rectum, but not till July 1894 could I persuade her to submit to operation. On opening the abdomen in July, I found a central tumour reaching half-way to the umbilicus. The right tube was greatly thickened and stretched over the mass, dipping down behind. The adhesions were very numerous and of all kinds. The aspirator drew off 4 ozs. of thick offensive pus, diminishing very little the size of the mass, which was then dug up from the posterior part of the pelvis. The communication with the rectum was deep down in the pelvis behind the uterus. The abscess cavity was opened during removal, flaky lymph escaping. A very thick pedicle was secured, and the mass cut away. The tube was quite 1" thick. The left tube was cystic, and with a large white ovary was also removed. The tube contained thin gumous dark fluid. No communication with the bladder could be found. After careful sponging the wound was closed, and a drainage tube left in. The mass removed from the right side consisted of a large abscess sac formed of a disorganised ovary. The tube did not communicate with the abscess and contained only a little dark fluid. The mass weighed $2\frac{1}{2}$ ozs. The left tube and ovary weighed $5\frac{1}{2}$ drs. The patient made a normal, afebrile recovery. When seen some months later she was in perfect health, and there was only slight thickening to the right of the uterus.

Case No. 6 presented some points of interest. The patient had been operated upon in Roumania, according to her own account, for sterility. In the centre of a cicatrix 2" long and parallel with the right Poupart's ligament was a sinus into which a sound passed downwards and backwards into Douglas' pouch for 3". The uterus was anteverted and fixed by thickening in the right cut, in which was the sinus above-mentioned. The left cul was also thickened. It looked as though a pelvic abscess had been opened in the right iliac fossa. A diagnosis of diseased appendages, probably pyosalpinx, was made. The pelvis was found to be filled with a hard mass on each side of the uterus, and adherent to it, feeling like an impacted fibroid; but the sinus was traced down, behind the peritoneum, as a cord-like tube, into the right mass. With much difficulty, owing to the density of the adhesions, a greatly thickened and dilated tube, with normal ovaries, was dug out from each side of the uterus. Good pedicles were secured, and the diseased tubes and the ovaries cut away; the ligature on the right side including of course the sinus. The tubes were enor-

mously thickened, but each only contained about a couple of drachms of pus. They each weighed $1\frac{1}{2}$ ozs.

The patient made a normal recovery.

Case No. 7 was also a double pyosalpinx. Vaginal examination showed the uterus to be pushed over into contact with the right pelvic wall by a fixed tubular body in Douglas' pouch about the size of a thick thumb. The condition, found on opening the abdomen was as follows:—Omentum thickened and adherent to pelvic organs. Right tube dilated and projecting vertically upwards out of the adhesions in the pelvis. Left tube also dilated to the size of a small sausage buried in adhesions in Douglas' pouch. The ovaries proved to be both healthy. On freeing the tubes and ovaries and applying

ligatures, the tubes on both sides cut through when the ligatures were tightened. They were too friable to hold a ligature, and the cut ends were therefore touched with a Pacquelin's cautery. The dilated portions of the tubes removed contained only a drachm or two of pus, but were greatly thickened, each weighing about 1 oz. No drainage tube left in. The patient did well for two days, but then became very restless, and died on the 5th day. The abdomen remained soft and flaccid throughout; the highest temperature noted was $102\cdot6$ just before death. A *post-mortem* examination showed entire absence of peritonitis, or fluid in Douglas' pouch or hæmorrhage from the stumps. The urine had been normal, and nothing was found to account for death.

CASES OF DISEASED OVARIES AND TUBES TREATED BY OPERATION IN EDEN HOSPITAL IN 1894, 1895 and 1896.

No.	Date.	Condition and number of children.	Length of incision.	Nature of disease and duration of illness.	Nature of operations.	Result.	Race.	REMARKS.
1	12th Feb. 1894.	M. 3, para. 3 abort.	3"	Chronic salpingitis and pelvic adhesions 3 months' history.	Both ovaries and tubes removed.	Cure	... English	Ovaries healthy; tubes thickened and closed.
2	22nd Feb. 1894.	M. 1, para.	3"	R. hæmatosalpinx and pelvic adhesions. Doubtful duration.	Do.	... Do.	... Bengali	.....
3	22nd Mar. 1894.	M. 0 para.	3"	Ventral hernia, R. salpingitis and small cystic ovary. Doubtful duration.	Hernia repaired R. ovary and tube removed.	Do.	.. Do.	... In 1893 a parovarian cyst had been removed from L. side.
4	23th Mar. 1894.	M. 1 about	4"	Double pyosalpinx. 6 months' history.	Removal	... Do.	... English	.....
5	18th July 1894.	M. 1 about	4	Abscess of R. ovary, discharged by rectum, and salpingitis (both sides). 9 months' history.	Removal	... Do.	... English	.....
6	10th Apl. 1895.	M. 1 para.	4"	Double pyosalpinx, above one year. A sinus in R. iliac fossa leading into pelvis.	Removal	... Do.	... Russian	Cicatrix above R. Poupart's ligament of an operation in Roumania.
7	24th Apl. 1895.	M. 1 para.	4½"	Double pyosalpinx, 4 years' history.	Removal. Tubes too brittle to be ligatured. Cautery used.	Death on 3rd day.	Bengali	No peritonitis or hæmorrhage; urine normal; death from debility.

(To be continued).

CHAPTER III.

COMPLICATIONS THAT MAY ARISE IN THE AFTER-TREATMENT OF CASES OF CATARACT EXTRACTION.

BY SURGN.-CAPT. R. H. ELLIOT, I.M.S., M.B., B.S.
(LONDON), F.R.C.S.

(Concluded from page 179.)

1. *Prolapse of the Iris*.—Allusion has already been made to this as one of the gravest complications that arise in these cases. Prolapse usually occurs within the first 24 hours, more rarely it is first seen on the 3rd or 4th day, and it may even occur later, if the section has not soundly healed. The patient complains bitterly of aching pain in the eye, and, in a large percentage of cases, one notices a sign, which is almost pathognomonic of prolapse. The sign referred to is a swelling of the

upper eyelid, filling up the space usually noticed between the eye-brow and the ball of the eye, and obliterating the natural creases in the skin of the lid. On separating the lids, the prolapse can be seen, and the patient is found to be suffering from severe photophobia; in many cases, there is ciliary congestion, and in the absence of treatment this last condition soon becomes pronounced.

Treatment.—There should be no delay in freely removing the prolapsed portion. Under cocaine, or, if necessary, in timid patients under chloroform, the section should be freely opened beyond the limits of the prolapse, and an iridectomy performed in the usual way, every care being taken to thoroughly replace the cut edges of the iris. The practice of merely abscising the prolapsed portion and leaving the margins of the prolapse impacted in the section is not one

which recommends itself to the writer's mind, though it is still resorted to by some surgeons. After free iridectomy in these cases, it is well to instil atropine, and to apply six leeches around the margins of the orbit, at the same time giving a free saline purge, and placing the patient on low diet.

2. *Impacted Iris*.—By this is meant the condition in which after iridectomy, the edges of the iris become impacted in the margins of the section. The symptoms are similar to those of prolapsed iris, but are usually much less marked. If the condition is diagnosed early, as it should be, it is better to open the section at once, and drawing each impacted edge out in turn, to remove a fresh piece of iris on either side and then to return both edges well into the chamber. Impactions of the nature under discussion are almost invariably due to slovenly iridectomies.

3. *Iritis*.—This is met with in one of two forms—acute or sub-acute. *Acute iritis* almost always comes on within the first 24 hours. The patient complains of very severe pain, and the usual signs of acute plastic iritis are present.

Treatment.—Atropine should be freely instilled, a brisk saline purge given, and six or seven leeches applied round the orbit. It is remarkable what excellent results are often obtained in cases of iritis, which at first sight threaten to end in total destruction of vision. A case in point is one in which the writer extracted a hard cataract from the eye of a high caste Hindu. The patient refused to wear any bandage, except silk, which he himself provided; the slippery silk failed to keep the dressings in apposition. When dressings came off the man rubbed his eye with his hand. The outcome was an attack of iritis so intense that the eye was almost despaired of. Under the treatment above indicated, the inflammation rapidly subsided, $\frac{1}{10}$ V resulting, and the patient being able to read the smallest type with ease.

Sub-acute Iritis.—The onset of this is less marked than is that of the acute form. A case, that apparently is doing well, may at the end of several days show signs of sub-acute iritis. Again cases of acute iritis may pass through a sub-acute stage before recovery. For such cases, the writer has tried all the various means with which he is acquainted for combating sub-acute inflammation of the iris, and he has no hesitation in saying that a seton in the temple gives far the best results of all. Such a statement may horrify those who consider that the word seton should not be heard in the era of antiseptic surgery. The writer adheres strongly to the principles of antiseptic surgery, but he is so firmly convinced by the excellent result he has obtained from using setons that he is not ashamed anywhere to avow his convictions in favour of this exception.

Atropine should of course be freely instilled a bandage applied, the bowels kept free, and the diet carefully regulated.

4. *Suppuration of the Eye-ball*.—This complication, which is so rare in Europe, is on account of the habits of the natives less easily avoidable in India. It is unfortunately impossible to make the more ignorant class of natives understand the importance of non-interference with the dressings. It is no uncommon thing for one of these patients to lift the bandage and rub the eye, should he feel any sense of local irritation.

In 1,086 cases operated on by the writer, there were 12 instances of suppuration of the eye-ball.

This complication first manifests itself not later than the second day. When the dressings are removed for the first time, the eye is seen to be in a condition of acute inflammation, and there is marked chemosis. Should anti-phlogistic treatment fail to arrest the disease, suppuration rapidly declares itself, and the eye is lost.

Treatment.—As soon as the surgeon has satisfied himself that there is no hope of saving the eye, evisceration or enucleation should at once be performed. In one of the 12 cases referred to, the writer delayed enucleation from day to day, hoping against hope. Finally the ball was removed; the same night, hyperpyrexia came on, and the patient succumbed within 16 hours of operation, with symptoms that appeared to point to septic thrombosis in the cerebral sinuses. One cannot help thinking that in this case one must have waited too long.

5. *Keratitis*.—The complication, which is commonly referred to under this name, has already been dealt with. It is of no importance, except inasmuch as the dimness of vision resulting from it sometimes leads the patient to fear that the operation has not restored him his sight. On this head he may safely be reassured. It is the custom in the Eye Hospital, Madras, to apply yellow-oxide ointment (gr. viii ad. 5i) to hasten the resolution of the opacity.

6. *Leaking Section*.—This is most often met with in old patients, in whom a conjunctival flap had not been made. Keeping the eye bandaged, and stimulating the section by dropping on it daily a solution of silver nitrate (gr. iii ad. 5i) will lead to rapid closure. The eye is certainly in peril until such time as the wound has healed.

7. *Catarrhal Ophthalmia*.—A slight degree of this complication is not uncommon after cataract extraction, but in those cases in which there has been catarrh previous to the operation, there may be a troublesome exacerbation of the condition, which may complicate the after treatment. Under these circumstances a weak sec-

tion may yield, and the Surgeon will then spend two or three anxious days. If the section has not yielded, and the catarh be severe, it is better to leave the eye open on the second or third day, so as to prevent the accumulation of irritating secretion in the neighbourhood of the corneal wound. Silver nitrate drops must be used daily. Obviously, however, prevention is better than cure, and if any catarh has been carefully dealt with by systematic treatment before the operation is undertaken one will seldom have trouble from this source in the after treatment.

8. *Soft matter left in the Anterior Chamber after operation.*—Occasionally, though rarely, one finds that cortical matter, which was not detected at the time of operation, has been left in the chamber. This has absorbed aqueous, swollen up and is now easily seen blocking the pupil. Such an oversight on the part of the Surgeon is only likely to occur in cases in which it has been deemed advisable for some reason to extract a cataract which is not quite mature. Where the amount of soft matter is large, it may be advisable to partly open the section and empty the chamber. The writer has done this successfully on more than one occasion, but on the other hand, he has seen such troublesome iritis follow the procedure, that he would now undertake it only in very exceptional cases, and he prefers to rely on bandaging and the use of atropine, with secondary needling, if necessary, when the eye has thoroughly quieted down.

9. *Secondary Capsule.*—When the presence of a capsule can be recognised at the time of operation, one may often remove the membrane by means of iris forceps. If this can be easily done, the eye is no doubt placed under very favourable circumstances, but one must remember that the proceeding referred to is not devoid of danger, since any sudden movement of the patient while the forceps are in the eye, entails a very appreciable risk of vitreous escape.

Should it be found, subsequent to operation, that a capsule left behind interferes with sight, and that the free use of atropine does not result in the opening up of a clear path for vision, dissection with two needles must be employed. If this operation is postponed for a month or more, until such time as the eye is thoroughly quiet, it is, in the writer's experience, a perfectly safe and harmless procedure. Any attempt to deal with the capsule at an earlier date than this is, to his mind, very dangerous.

10. *Hæmorrhage into the Anterior Chamber.*—It has been mentioned that in India it is no uncommon thing for the patient to interfere with the operated eye. Many of the more ignorant people are destitute of that self-control, which is commonly possessed by the European. Should such patients experience any sensation of discomfort in the eye, no warnings that have

been given them suffice to prevent them from rubbing the organ.

The result of such a proceeding may be a rupture of the section, or an extravasation of blood into the anterior chamber. You may visit a patient two days after operation, and find him with a closed chamber, a clear quiet eye and good vision, and yet on the following day you may find him practically blind, with his anterior chamber filled with blood. Fortunately the results of this accident are not usually serious. If the dilatation of the pupil be maintained by means of atropine, and the eye be kept closed with bandages, the blood will be rapidly absorbed. As a rule, absorption takes three or four days, but the writer has known an eye clear absolutely of blood within twenty-four hours, and that too in a case in which the fluid of the anterior chamber had appeared to be entirely replaced by blood.

11. *Bubbles of Air left in the Anterior Chamber.*—In two of the 1,086 cases under review, a bubble of air was discovered in the chamber subsequent to operation. In one case the bubble remained until the patient was lost sight of. In neither case did the presence of air appear to do any harm. In patients, whose eye-tunics are abnormally rigid by reason of age, a sudden movement may render it impossible to prevent air from passing into the chamber. As a rule it is quite easy to express this air, but should the patient be fidgetty and nervous and refuse to look down steadily it may be impossible to satisfy oneself that no bubble of air has remained under the iris.

12. *Secondary Glaucoma.*—Three of the failures in the series under review are attributed to secondary glaucoma. Possibly, in spite of precautions, a tag of capsule may have become impacted in the section. The treatment of this complication is eminently unsatisfactory. The increased tension is associated with a condition of ciliary congestion in such a way that eserine and atropine are alike harmful.

THE SO-CALLED KALA-AZAR OF ASSAM.

By SURGEON-MAJOR G. H. FINK, I.M.S.,

Civil Surgeon, Garo Hills District.

(Continued from page 214.)

MALARIAL fever is the prevailing disease in the district, and by glancing over the figures in Tables II and III it will be observed that this disease prevails pretty generally throughout the year, reaching its acme between the months from May to July, when it begins to decline gradually throughout the cold season, and is resuscitated in March, increasing in virulence in April, May, June and July, so that from March to July might be said to be the unhealthiest months, and I fear that many cases of malarial fever are then called by the so-called term kala-azar, there being a tendency for the skin to

darken through certain influences exerted by the poison in the blood and influenced undoubtedly by moisture and rainfall in the presence of light and heat. The colouring matter of the blood or hæmoglobin, although the same in actual name, seems to be of different quality in different individuals and races. Its action on the light or fair-skinned and on the brown or dark-skinned is different in the presence of light. The intense anæmia of kala-azar is undoubtedly very marked but when strongly contrasted against a black skin, looks a deadly white and is ghastly! If we come to consider the conditions under which the Garos and other races of the Assam Hill tracts live, the climate, the constant exhalation from the dense jungles, the influence of rainfall in several parts, which is very heavy, the scanty clothing, which exposes their bodies from their birth to severe chills and heat alternately, the amount of "chu" or rice-beer consumed, even by infants, whose mothers fail to produce milk, and the milk of cows and goats is abhorred owing to the prevailing idea that it is mixed up with the animals urine; the amount of chillies and cayenne-pepper by handfuls which they and their children eat daily with their rice, and dry, or rotten fish, probably teeming with ova of worms, is it to be wondered at that such a disease known as kala-azar plays sad havoc in a village? The Garos, I observe, are not like the Lushais, as regards the building of their huts. Their huts themselves are well-constructed many of them clean and commodious, but away down in hollows, and not on the ridges as the Lushais build. Moreover, Lushais, as a rule, move every three years from one site to another. I must say, from my observance of the two races or Hill tribes, the Garos are cleaner looking, and I believe that, from their attention to certain details about their house sanitation in the interior, they are a people who would more readily assimilate ideas of sanitation and act up to them if the seeds were sown.

I was particularly struck with one village which I visited near Kherapara in the Dabi circle. The houses were built, each on a spur and in the form of a circle, with their crops of sweet potatoes, cotton, chillies, pumpkins, etc., all around. The front of the house had a verandah, which opened into a large room, in which the occupants slept and cooked their food. Behind this room, was another room, about half the size of the former, with this difference, that the former was a raised floor of bamboo lathes about 4 feet above the ground, whilst the latter was a ground-floor with a raised "machan" about a foot high by two feet wide in each side of the room, upon which their bulls slept and were fed with bamboo leaves and in splendid condition. The centre of the floor was strewn over with husked rice, in which the hens and chickens enjoyed themselves. In the evening when they had had their full feed and were satisfied, a

little Garo girl with a broom, brushed away the husked rice into a basket, cleaned the "machans" and the droppings from the bulls, and here was a home for their animals, clean and sweet as you would see almost anywhere. Considering the hard life of the Garo men, women and children, I consider that the careful attention paid to details connected with their live-stock, speaks highly for the regard they have for sanitation. I trust I might be excused in digressing by this minute description of Garo hill life.

In the N.-W. P. and Oudh, a characteristic aspect of malarial fever or cachexia presented intense anæmia, with a yellow or orange skin of a dull colour with general anasarca and a somewhat waxy or bloated countenance. As a rule, the spleen was enlarged and there was a slight trace of albumen. There was no history of alcohol in these cases (Hindus and Musalmans). One case of a woman who presented bad ascites, was tapped and I found that, on the fluid being drained off, on searching for the spleen, it was found to be a case of enlarged but wandering spleen which rested on the pelvic brim, and which subsided under proper treatment. As a rule, these cases took a whole month to manifest signs of improvement, and scarcely a case did not pull through in that time. The treatment adopted generally was antimalarial and tonic, with suitable diet easy to digest and assimilate, and given at regular intervals and in small quantities, until digestion improved. A full diet was injurious, and created indigestion and diarrhoea. In addition to the above treatment, a few cases had to be put in hot vapour baths daily. Hot bricks wrapped in moist pieces of blanket were laid alongside of the patient, but not too close to scald his body, and blankets were wrapped round to excite free perspiration. When improvement set in, it was very rapid indeed, and the man seemed almost reduced to a skeleton first, before he put on flesh and a healthy aspect. In very bad cases of ascites and general anasarca, the following pill was administered to restore the balance between elimination and absorption:—

R	Elaterii	... gr. ½
	Pulv. Digitalis	... gr.
	Ext. Hyoscyami	... gr. ss
M. ft. pil Sig.	—To be taken every other night;	

or the following:

R	Elaterii	... gr. ½
	Pulv. Jalpæ Co.	... gr. xx to 3i

M. ft. pulv, Sig.—One powder every 3rd or 4th night as required.

When improvement of the anasarca set in, and the patient said he felt little more comfortable—

R	Quinæ Sulphatis	... gr. iiii
	Acid Sulphuric dil.	... m v
	Ferri Sulphatis	... gr. i to ii
	Aquam ad	... 3i

M. ft. mist. Sig.—To be taken three times a day, after meals.

If Quinine alone would not act as in the above prescription, the following was administered—

R Quiniae Sulphatis ... gr. ii
Ferri Sulphatis ... gr. i
Acid Arseniosi ... gr. $\frac{1}{16}$

M.ft. pil. Sig.—One pill to be taken thrice a day after meals.

When the patient had considerably improved, and if symptoms of quininism were present, the following pill was administered.

R Ferri Sulphatis ... gr. ii
Syrupi Simplicis ... q. s.

M.ft. pil. l. Sig.—One pill thrice daily after food.

If there was anæmia with hæmmorrhage—

R Liq. Arsenicalis ... m. iii
Tinct. Ferri perchlorid ... m. v to x
Aquam adde ... 5 iv

Sig.—Three times a day after food.

Such cases were not frequent; but there appears to be a large number present in the Garo Hills, especially epistaxis among children in the later stages of the disease, where diarrhoea and dysentery frequently set in, and there are enlarged livers and spleens present.

It is curious, however, that although the physiological signs, symptoms of the disease as seen in the N.-W. P. and Oudh and other places as contrasted with Assam were almost identical, there was this difference, that in Assam there were more cases of enlarged liver, accompanied with enlargement of the spleen as well in infants and grown up children from 8 to 12 years of age. Surely this difference in the enlarged liver is due to the quantity of "chu" or rice-beer, and the large amount of chillies and Cayenne pepper which the Garo consumes. There is cirrhosis of the liver with ascites. On examining the urine of the patients in the N.-W. P. and Oudh, there was often, in fact in most cases, albumen present in the urine. The history was not that of alcoholism or of Bright's disease pure and simple, but one of intense malarial poison; in fact a malarial saturation which effected the kidneys and probably due to the fact that these organs were predisposed in some way, or had an undue strain thrown on them. If we consider the climate of the N.-W. P. and Oudh and its effects upon the excretory functions and also the opium habit, they might perhaps be of some importance in these cases.

In Assam, the climate is moist and the skin acts freely; but the organs of digestion and the liver suffer considerably during the rains, or, as a Sikh, whom I had a talk with here, said, "In the Punjab it is our chests we have to look after, here, it is our livers!"

I have in my hospital at the present time the following case:—

Khatuap (Garo) male child, *æt.* 8 years, was admitted into the dispensary on the 13th March 1897, with fever, temperature 100°F. Patient is very weak with *œdema* of face and leg, hypertrophy of liver and spleen. Has been subject

to attacks of fever, and says he was told he had kala-azar. He was given a dose of castor oil on admission, passed three motions freely. No round worms have ever been passed. His urine is slightly acid. S. G. 10.10.

Since his admission the patient has had anti-malarial treatment with Chloride of Ammonium and Nitro-Muriatic Acid dilute, under which he has improved considerably, and the enlargement of the liver and spleen, though still present, have reduced a great deal.

Another case of a similar character, which was treated by me some time ago and recovered, is the following:—

Sepoy Dhiam Ram, of the Garo Hills Military Police Battalion, caste Jhurwa, age 21 years, was admitted into the Military Police Hospital on the 20th November 1896, with the following symptoms:

Had colicky pains in the abdomen all yesterday (19th November '96) and on arriving at hospital, the Hospital Assistant treated him for colic and gave him castor oil and tincture opium, after which he passed three stools without any relief of the pain.

He was then prescribed Sp. Chloroformi m. 15, Aqua Menthae Pip. \bar{z} i, three times a day, and a mustard plaster over the abdomen.

21st November.—I saw him, and he complained of pain in the umbilical region, diffused in character, and his stools contained a little mæcons.

On examination of abdomen carefully by palpation and percussion, there was much tenderness over the hepatic region and enlargement of the liver to the extent of two-and-a-half fingers' breadth below the ribs and also enlargement of the spleen. Patient was very emaciated, cheek bones standing out, ribs prominent, skin dark in colour, breath offensive, tongue coated with a brownish mucous, teeth covered with sordes, abdomen protruding and hard, pulse quick and feeble. Temperature, 103°F., patient prostrated.

Diagnosis.—Malarial fever with hepatitis.

Prognosis.—Serious

Treatment.—Hot fomentations to abdomen every third hour.

R

Ipecacuanha and opium pill.

Sig.—One every third hour.

Diet.—Sago and milk only, in small quantities, every second hour.

24th November 1896:—Pain not so bad as before: but still present, tenderness present, temperature last evening 101.2°F., this morning 100.6°F. Treatment continued as before. Diaphoretic mixture \bar{z} i every third hour.

25th November 1896.—Temperature, E. 102.6°F., M. 101.6°F., no improvement.

Treatment.—Add Potassii Iodidi gr. ii to each ounce of Diaphoretic mixture.

Diet.—As before.

27th November 1896.—Temperature, E. 100.4° F., M. 100° F.

Pain continues.

Treatment.—

R Ext. Taraxici	...	gr. iv
Ammonii Chloridi	...	gr. v
Acid Nitro-Muriatic	...	dil. m. x
Infus. Chiretta	...	ʒi.

Sig.—Threc times a day

Continue fomentation.

Continue diet.

6th December 1896.—Pain less, slept well at night, one motion at 4 A.M. passed.

Treatment.—

R Ammonii Chloridi	...	gr. iii
Acid Nitro-Muriatic	...	dil. m. x
Spt. Chloroformi	...	m. v
Tr. Calumbæ	...	m. x
Aqua	...	ʒi

t.d.s.

7th December 1896.—Temperature, E. 99.2° F., M. 98.0° F.

Treatment.—Continue mixture as before, hot fomentations with Nitro-Muriatic Acid dilute, m. xv every third hour, over hepatic region.

8th December 1896.—Temperature, normal.

Treatment and diet.—Continued as before.

The patient now began to mend steadily, and although his temperature had a disposition to rise, it never went beyond 99.4° F.; and was chiefly due to the bowels being constipated, and no sooner castor oil was given to relieve this, his temperature lowered and he became convalescent on the 13th December 1896, when his diet was improved, and he was discharged cured.

Pigmentation of the skin and buccal mucous membrane in patches is regarded as characteristic of the disease known as kala-azar which, is said also to cause a general blackening of the skin; I must acknowledge that if kala-azar is characterised by these points in Assam, I have seen the same changes out of Assam, in the Punjab, Beluchistan and N.-W. P. and Oudh. I daresay the disease presents these characteristics more strikingly in Assam, because the races are generally dark-skinned as compared with the northern races of India.

It is curious that in the life of Sir Henry Lawrence by Sir Herbert Edwards and Herman Merivale, pages 69 and 70, the following is mentioned:—

“Getting down to the river Sutlej, which is here frantic to escape out of its mountain prison, he finds some very dark and wretched looking people inhabiting a row of huts. They are gold-washers, and from their appearance must gain but a precarious livelihood by their search after gold.

“I have observed the darkest people in every country to be those living on the rivers. In China among a fair race, the myriads that swarm the Canton river are so dark as to appear

almost of a distinct race. It cannot be the direct rays of the sun for that is felt in other occupations; but the sun must have more influence when reflected from the water.”

There is not the least doubt that the alterations of colour are due to pigmentary changes in various diseases which are influenced in the presence of sunlight and moisture. We have seen the effect of Röntgen rays on the skin recently illustrated. The skin is like a sensitive plate and gives evidence of blood changes in its colour and its touch to the hands.

Some temperaments or habits show more rapid evidence of their state or condition in their skin, particularly those of a lymphatic or phlegmatic habit. The pigmentation of the skin would depend very much upon the individual attacked. In the European, we see the variety of shades in the plethoric, in the blonde and the brunette skin when attacked with fever or jaundice. In the light-skinned Asiatic, it assumes a dark orange or yellow colour, whilst in the brown and dark races, a dark mahogany or black colour appears. Malarial fever affects individuals who are constantly exposed to its influence, who are badly nourished and clothed, far more severely than those who are living under favourable conditions.

Moreover, its complications would set in according to the habits of the individual. Liver complications in their worst forms appear among those addicted to alcoholic abuse. Among Garos “chu” is drunk in large quantities by every man, woman and child *ad libitum* almost. When we consider this, and besides the very scanty clothing they wear, can we wonder why their livers are attacked and that cirrhosis of the liver is present. It seems to me it would be a greater wonder if it did not occur in them.

I have seen several cases of enlarged liver in young lads in this district which are not purely malarial in character. Enlarged spleens also can be counted by the score in every village almost; but I am firmly convinced that the enlarged livers are the result of free libations of “chu” and exposure from infancy. The Garos themselves state that half their rice is converted into “chu,” and I have heard others say the same of them. In seasons of prosperity and good harvests, it is naturally drunk more freely, as rice is then plentiful and cheap. It is probably the cause of a great deal of sickness too, producing many cases of diarrhoea and dysentery, which, in addition to malarial fever, creates a very high mortality and the dejecta become in a measure infective and will it be observed that in cases of so-called kala-azar with the black skin, do not assume the typical characteristics until late in the disease when the closing symptoms are diarrhoea or dysentery with great emaciation and lowered vitality, whilst anasarca is absent in any great degree. Then there are other cases where lung complications do set in

as the result of pneumonia and pneumonic phthisis.

The presence of anchylostoma alone would not account for so high a rate of mortality, although in the cases where it is found, it aggravates the symptoms most decidedly, and is an additional factor in the production of that intense anæmia which we witness in cases of kala-azar. The anchylostoma might also excite diarrhœa by intestinal irritation if present in large numbers in the bowel.

Malarial poison might be regarded in the sense of a cumulative poison if left untreated, and the majority of cases in these hills are left totally without any proper medicinal treatment. "Pujahs" are greatly resorted to by Garos in times of sickness and at these "chu" drinking and flesh eating are largely resorted to.

Malarial fever would create as terrible ravages among any community in India if left untreated and if pujahs of the Garo type alone were introduced.

In these hills one would expect to see malarial fever in its very worst forms, and the effects almost epidemic in character, in the same way as we witness epidemic infectious pneumonia in Beluchistan, S. Afghanistan, and the North-West Frontier of India. Those who have not witnessed epidemic infectious pneumonia in this particular form in the N.-W. Frontier cannot imagine what it is, for, it kills in a few days, strikes down the healthy and strong who watch by the bedside of the sick; but the malarial sodden and scorbutic are twice as liable as others.

We know that for many generations malarial fever has played a great part in the mortality of the Indian population. We must not expect however to find it in a stereotyped form always as described by various authors. Altered conditions of life and habit bring about alterations and deviations, create complications which altogether disfigure or deface the original disease, and then a new name is sought for. Look at typhoid fever in Europe and the disease in India. Even in Europe the disease has become altered of late years, we are told, and that we see more cases of constipated typhoid than diarrhœtic; that in many cases Peyer's patches do not present those changes which we read of, but that an inflammatory condition of glands of the large intestine is all that is seen.

In many other diseases such deviations could be pointed out in India. Do not climate and altered conditions of life sufficiently explain them?

Moran's figures for anchylostomiasis are somewhat startling, as they go so far back as 1891, and from 1892 to 1895 we found anchylostomata among convicts from other districts besides Gorakhpur district and jail. Moran considers that the large mortality in Gorakhpur jail is due to this scourge, and that other worms,

frequently, round worms, are met with in this district.

The numbers of anchylostomata which Moran has found in his 159 *post-mortem* examinations, out of a total of 174 performed on convicts, varied from 1 to over 1,000, and the total number of worms in these *post-mortems* was over 8,000 giving an average of 50.3 worms to each individual as the cause of the high mortality. These figures then show that the disease has been present in the North-Western Provinces and Oudh for some years past, and perhaps created the mortality which has been attributed to malarial fever and anæmia.

It would, I think, be worth recording what the mortality in previous years in Gorakhpur district and jail is ascribed to, and whether the climate, habits of the people, or bad sanitation alone, has been the cause.

Moreover, if Giles has found anchylostoma in Saharunpur jail, it shows that the disease is wider in its distribution than it was suspected to be.

With regard to its presence in prisoners from other districts employed in jail construction at Gorakhpur, it would be interesting to know from what districts these prisoners came and how long they were in the Gorakhpur district or jail, and what their previous medical history is. Also, those who did have the worm present, what district they belonged to.

We should then have some idea as to whether the disease is localised in Gorakhpur or has a wider distribution. These points are of great interest in ascertaining whether beri-beri, pernicious anæmia or malarial cachexia were present before Moran discovered anchylostomata among the prisoners. It would also call for certain precautionary measures in the transfer of prisoners from one jail to another, and before effecting such transfers their health might first be scrutinised most carefully.

It is curious that while anchylostomiasis has received such prominence by Giles and Moran in their investigations, that Surgeon-Major O'Gorman who has written in p. 430 of the *Indian Medical Gazette* for November 1896, under the title of Kala-azar, has given so contrary an experience in his search for the parasite in some of his cases described as pernicious anæmia which Dr. Hancock, a local practitioner, in charge of many tea gardens, pronounced to be cases suffering apparently from the same disease, as he (Hancock) had obtained specimens of anchylostoma from in one of his coolies and recommended thymol as the proper treatment.

O'Gorman put this treatment to the test in the presence of his consultant, in the orthodox fashion he says, and failed entirely to dislodge a single worm. Moreover, he relates the danger of thymol administration.

O'Gorman's trials at Midnapore in about 200 *post-mortem* examinations in two years failed to find the anchylostoma.

Moreover, he leans towards the malarial origin like a great many others.

With all this mass of evidence, the question is still asked, what is kala-azar?

With due respect to the labours and discoveries of Giles in the search after the truth, the malarial origin of the disease is one which seems the most natural to follow in the face of the clinical features of the disease and their very powerful identity with malarial fever or cachexia in the most intensified degree.

The term kala-azar, comes from the Assamese "Kala" = black, and "Zor" = disease or fever. The pigmentary changes creating blackness of the skin are all consistent with malarial fever. In Addison's disease the pigmentary changes have been traced to the supra-renal bodies. Have these bodies been carefully examined in kala-azar? *Anæmia, enlarged spleen and liver* are all consistent with malarial fever, and there is no reason why we should leave the commonest affection which has caused the highest mortality for generations and fly to 50 parasites per individual as an explanation for this mortality.

(To be continued.)

MEMORANDUM.

PLAGUE AND HOUSE DISINFECTION.

By SURGN.-CAPT. T. E. DYSON.

Dy. Sanitary Commissioner, Bulsar.

IN summing up the experiences of plague and plague preventive operations during the recent epidemic, one result will, I think, be generally admitted: that the expenditure of money has, been unnecessarily great.

The chief items of expenditure in connection with the suppression of plague come under the headings of men, material, and machinery for directing and carrying out the work of house disinfection: and, therefore, any means economizing time, labour, and material on these operations, will be so much gain.

The prescribed routine of house disinfection consists in a preliminary disinfection, gaseous or liquid, followed by opening up of the house to sunlight and air, digging up and removal of earthen floors, and complete line-washing of the interior.

The occupants, meanwhile, are to be accommodated in sheds, and kept there for a period varying from 10 days to a month.

An imperfect knowledge of the vitality of the plague bacillus, no doubt prompted such drastic measures.

For a month this routine was steadily followed in Bulsar and with good results, but insufficient labour necessitated a recourse to the simplest effective treatment of infected houses, in order to outstrip the disease. Consequently a trial was made of disinfection only with a solution of

corrosive sublimate, 1 to 1,000, applied by fire engines and hand pumps exactly as in case of fire.

This treatment was not confined to houses actually known to be infected, but whole streets and quarters in an infected area were washed down, and all bedding and clothing found in the houses were similarly treated.

The result was most gratifying. In 14 days the fight was over, the disease as an epidemic was stamped out and only a few sporadic cases occurred during the next three weeks. The same result could, without doubt, be obtained in any town, provided labour and material were in proportion to the area affected; but, to be effective, the attack should be directed to prevent the spread of infection and not merely to crush each individual outbreak.

It is well to bear in mind that people may carry infection to a house and may also become infected from a house, in which plague stricken rats have been living.

There are, therefore, two factors to deal with; a human population above ground, whose movements can be more or less controlled, and an animal population, under ground, whose wanderings can not be checked. Consequently in house disinfection it is not enough to follow in the train of the disease; the attack should be directed from all sides, and as soon as a street or quarter in a town shows signs of general infection, by the daily occurrence of one or more cases of plague, the whole of that street or quarter should be rapidly and thoroughly disinfected.

This method of disinfection has certain other advantages. It ensures almost complete immunity from infection to labourers, and can be carried on without incommoding the occupant of a house, for longer than the few hours, during which the house is drying.

In Bulsar two quarters were disinfected in this manner without disturbing the inhabitants, and although subsequent cases of plague occurred, necessitating a second or even a third washing of a few houses, there was no further spread of the disease.

Simple disinfection by corrosive sublimate offers an easy, cheap and effective means of treating plague infected houses, and moreover causes less inconvenience and discomfort to the occupants of a house than more elaborate operations.

A Mirror of Hospital Practice.

ST. STEPHEN'S MISSION HOSPITAL,
DELHI.

CASES OF DYSTOCIA DUE TO MONSTERS, &c.

BY MILDRED E. K. STALEY, M.B., LONDON.
Physician in Charge.

Case I.—Twin Pregnancy—Monster.

This patient was said to be in the seventh month of her first pregnancy, and the first *fœtus*

had been born three hours before assistance was sent for; though small, it was perfectly formed.

The feet of the second child could be seen hanging from the outlet, the skin and other tissues over them being rubbed off and broken by the pulling the legs had been subjected to by the dais for three hours past.

On passing the hand up to get a good grip of the buttocks, the uterus was found to be distended by a large fluctuating mass, the tense abdomen of the foetus, and no head could be felt anywhere.

The abdomen was punctured, and a large quantity of fluid evacuated, after which the body was easily delivered, together with the soft diseased-looking placenta.

The head and upper extremities of the foetus consisted of small lumps of flesh, quite rudimentary, but the legs were properly formed.

Case II.—This was the patient's third pregnancy, the two former ones had been normal.

The patient had been about five days in labour, and the membranes had ruptured four days before she was seen.

The os was about the size of a rupee and a hand presented through it, which the dais had been pulling at assiduously while, propping the patient up against a wall, they had butted at her abdomen with their heads with a view to assist delivery!

The os was gently dilated with the fingers, till the hand could be passed into the uterus. Then it was found that there was a large mass as hard as bone blocking up the whole right side of the pelvis, and apparently growing out of its wall.

The feet of the child were to the left, the back turned forwards, and no proper head could be felt.

As there was very little room, and the uterus had been subjected to so much pressure and bruising, no attempt was made to turn, but without withdrawing the hand, the foetus was removed piece-meal by embryotomy. It was long before the uterus could be got to contract, and it is hardly to be wondered at that though the patient rallied for a short time, she died 24 hours later in great pain. One more victim to the ignorance and cruelty of the native midwife.

The head of the foetus was represented by a flattened blob of flesh directly springing from the broad shoulders, the rest of the body being that of a large well-formed child at term.

Case III.—Double-faced monster.

This was patient's fifth pregnancy, and all the previous ones had been normal. She had been several days in labour, and (as the notes describe it) "had been well pommelled and pulled about by dais."

On examination the os was found slightly dilated, and the presenting part, which was high up, seemed to be of irregular shape and unusual size and hardness.

Podalic version was performed and the body of the child easily extracted.

Great difficulty, however, was experienced with the after-coming head, but at length it was delivered after much manipulation.

It proved to be that of a monster with two faces. The head sprang directly from the shoulders and the general appearance was as if a portion of two skulls behind the parietal bones had been cut off from two heads, and the remaining front portions had been applied together back to back. The features of the front face were more perfectly formed than those of the back one.

A few notes of cases of malpractices by dais and half-trained native "lady doctors" may be of interest, as in the May number of this Journal readers are "earnestly requested" to describe cases of mismanaged labour.

Case I.—The dais called in the day before this patient was seen, had somehow or other got hold of the legs of the child and managed to extract the body, but had used such force in doing so that the neck gave way and the head had remained behind in the uterus, together with about half the placenta and membranes! The dais had been fishing for the head ever since, and one was engaged in pulling out bits of the placenta (or anything she could get hold of) in the unsuccessful search, when I arrived on the scene, and inserting the whole hand after dilating the os, was able to empty the uterus of its contents.

Case II.—This patient was delivered of a premature foetus at 5 A.M. one morning. The "lady doctor" diagnosed a second child in the uterus and spent the next seven hours trying to "rupture the bag of membranes," while an old dai squatting on the bed pulled at the cord! Finally assistance was sent for "to delivery retained placenta."

On examining with the hand in the uterus, a large interstitial fibroid tumour was found projecting into the cavity, while above it, at the fundus, was the adherent placenta which all the pulling it had been subjected to had failed to dislodge.

The lower surface of the fibroid was bleeding profusely where it had been torn or cut in vain efforts to "rupture the bag of membranes."

The placenta and membranes were pulled off, but it was long before the uterus could be got to contract, and the patient remained in a very serious condition from loss of blood, &c.

In another case lately, a trained dai of this hospital was called out to see a patient in a village. She was said to be six months pregnant and to have been bleeding for two days.

On arrival the nurse saw she was past hope, but thought she would examine. In the vagina were some clots and after douching these out, he felt a small hard thing sticking out of the os, and when, by gently twisting it round this was

removed, it turned out to be a piece of rough stick about 7 inches long, the lower end as thick as the finger tapering to a point above.

This had been inserted two days before by a "midwife" to "make the child come away" the patient had been in such bad health that she did not think she ought to go on to term.

There were, however, no signs of pregnancy, an enlarged spleen and general debility accounted for the amenorrhœa. The woman died in great agony an hour or two later, the family much comforted that she was not dying undelivered. Many cases might be cited of vaginas found packed with mud, stones, pice (a practice connected with an especially vile religious custom of the Hindus) and other odds and ends.

One patient who had to spend many weeks in this Hospital, undergoing repairs, had been instructed by the dai to sit on the sharp handle of a stone hand flour-mill, with the view of accelerating the labour; when a turn was given to the handle, it at once ripped up the perinæum and passed through into the rectum, cutting it for some four inches up.

Such cases as these must continue to abound so long as there is no Registration Act for India, and so long as municipalities do not recognise that it is their duty to provide the public with properly-trained midwives of a *respectable class* and to prevent unqualified uncertificated midwives from practising on pain of a heavy fine rigidly enforced.

DROWNING IN SHALLOW WATER.

BY ARTHUR POWELL, B.A., M.Ch.

THE following cases which present very similar features may be of some medico-legal interest.

Case I.—Patu, m., *æt.* 20, liable to epileptic fits, for which he had been under treatment at intervals for two years, went to work in some muddy rice land on 14th May 1890. An hour later he was found dead, lying with his face downwards in a shallow pool. The water was so shallow that only his mouth, nose and the right side of his face were immersed, the left eye and side of face being above the surface.

The rest of his body from the neck downwards was on dry ground.

Post mortem.—The mouth, nasal cavities and air passages contained mud and green water weeds.

Case II.—Mazli, *æt.* 26, had attended hospital for epilepsy. On August 23rd, 1890, she was found dead, face downwards in an almost dry drain. I measured the depth of the water at once and found the maximum for some distance to be 2 inches, except a depression $3\frac{1}{2}$ inches where her head had lain

Post mortem.—Air passages contained sand and muddy water with a few plates of grass; skin of face soddened a *la blanchisseuse*; elsewhere *cutis anserina* marked. Uterus contained eight months' foetus.

THREE CASES OF EMPYEMA SUGGESTIVE OF AN INFECTIOUS NATURE.

BY ARTHUR POWELL, B.A., M.Ch.

THE three cases now recorded occurred within three weeks of one another at Duna, the smallest of the tea gardens in my practice, with a population of only 150. Since November 1895 there had been no case of empyema on twenty-four gardens with a population of 15,000 coolies inspected daily by the native doctors, nor had I operated on a case, brought from a distance since April 1895.

Case I.—L. M., aged 40, came from Purnia, suffering from influenza and slight dysentery. Pleurisy set in and went on to suppuration. On January 7th, 1896, having been brought to hospital for operation, he died suddenly, while the instruments were being laid out.

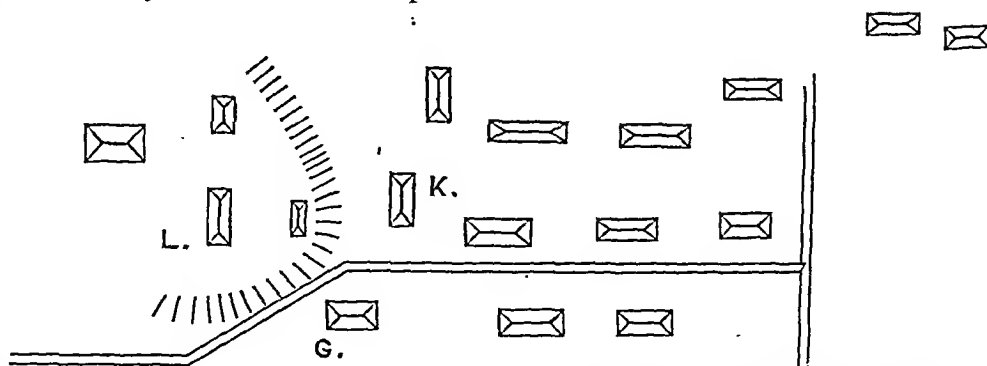
Post mortem.—Right pleural cavity full of pus, liver and other organs healthy.

Case II.—K. M., 35, developed pleurisy during an attack of influenza. Rigors and sweats ensued, till, on January 15th, 1896, he suddenly coughed a large quantity of pus, evidently from the plural cavity. He continued to cough up pus in diminishing quantities till last seen on April 12th, 1896.

Case III.—G. M., 38. Influenza since middle of January, 1896. Pleurisy set in and suppurred. On February 13th the pleural cavity was freely drained.

Agar and gelatine tubes were inoculated with the pus but remained sterile.

The accompanying map of Duna will emphasise the theory of infection:—



L. Situated on side of a hill is the house of Case I.
K. Do. at foot of the hill is the house of Case II.
G. Do. do. do. do. do. Case III.

The close proximity of the dwellings of all three patients and the similarity of the symptoms would seem to point out some connection, such as infection or contagion, though no micro-organism was found in the only case tested.

I hoped to find the pneumococcus, but it was apparently absent.

THE STANDARD.

A Scottish Life Office of 70 years' standing, and one of the wealthiest and most progressive of the Provident Institutions of the United Kingdom.

DOUGLAS STEWART,

Secretary,

Standard Buildings, Dalhousie Square,

CALCUTTA.

Indian Medical Gazette.

AUGUST, 1897.

LEAVE AND THE INDIAN MEDICAL SERVICE.

MUCH dissatisfaction is being felt in the Indian Medical Service owing to the continued stoppage of leave. A strain no doubt has been thrown on the service by the occurrence of plague, famine and frontier disturbances. But even before these calamities, it was felt that the strength of the service was much below that needed for the duties which it had to perform or in proportion to the extension of our Indian Empire. For many years past the Indian Medical Service has been much undermanned and there has constantly been much difficulty in getting leave. Officers in India require periodical leave to recruit themselves and this applies more to medical men than almost all others because their work is carried out under depressing and unhealthy conditions. No medical officer is now permitted to take leave except on medical certificate, and even under these circumstances the Provinces are denuded. Few men, unless they are very ill, care to present themselves before a Medical Board, although they feel assured that leave is a necessity to prevent a breakdown later on. Is it fair, it may be asked, to place officers in this invidious position?

It is not only on personal grounds that this grievance may be considered. With loss of energy and interest in the duties assigned to them, which must necessarily follow from long residence without a break in an exhausting climate, the medical officers are not able to give that keen attention to their duties which their importance demands. The work tends to become

mechanical, and the public service consequently suffers. This condition of things may be compatible with apparent health, when appearance before a Medical Board is out of the question.

The Government in order to carry on the medical administration of the country have, under the circumstances, been put to great straits, and we sympathise with their position. To meet the difficulties of the situation, they have, as we have stated, stopped all leave except on medical certificate, which we have shown is detrimental to the interests, public and personal, of the service; they have further appointed Assistant Surgeons in positions which have hitherto been held by commissioned officers,—a proceeding which is not viewed with favour by the civil population—and lastly they have been obliged to fall back on the employment of superannuated officers, an example of which is the recent case of a senior medical officer, whose superannuation is due in a short time, and who is to be granted an extension of one year's service, the reason given being the paucity of medical officers. This extension, though no doubt in the interests of the individual, is certainly against those of the service. By its promotion is blocked and a deep sense of dissatisfaction is produced. The above facts tend to show in a clear manner the inadequacy of the staff of the Indian Medical Service, as it at present stands, for the duties which it has to perform. It would be well, we think, if the Government thoroughly considered these facts, and as a consequence saw their way to increase the number of medical officers in proportion to the needs of our Indian possessions. The establishment should be large enough to meet the various wants of the civil and military authorities, while at the same time it should provide a reserve of officers to replace those on leave.

THE PASTEUR CHAMBERLAND SYSTEM OF FILTRATION AT THE DARJEELING WATER-WORKS.

GREAT interest attaches to the introduction of the Pasteur-Chamberland system of filtration into the Darjeeling Water-works owing to its being the first occasion on which a town has been supplied with drinking water subjected to a system of filtration which aims at the exclusion of all micro-organisms that may be in the water

at the time of its collection at the reservoir. The Pasteur system has been used with the greatest success for many years past, notably in the hospitals, barracks and public institutions of France, but never on any very large scale. Naturally, sanitarians are awaiting with interest the result of the installation at Darjeeling; for, if it meets with the success there that is anticipated, there can be little doubt of the introduction of the system into other towns and localities.

For many years past the Darjeeling drinking water has had a bad name. Complaints have been repeatedly made both by the Public and the Press as to the condition of the water-supply, and medical opinion has always been unanimous that much of the ill-health at Darjeeling has been due to this cause. Analysis, both bacteriological and chemical, supported this view. In 1894 Surgeon-Lieutenant-Colonel Cobb, then Civil Surgeon of Darjeeling, when visiting the Indian Medical Congress, had an opportunity of becoming acquainted with the working of the Pasteur system, which was then on exhibition there. Having previously been much impressed with the necessity for an efficient method of filtration for the Darjeeling water, it occurred to him that the system was well adapted for this purpose. He accordingly wrote for the Darjeeling Municipality a note on the subject, entering fully into the reasons for the adoption of the filter. This note was published in the *Indian Medical Gazette*. Much opposition was at first brought to bear against the project, but with the invaluable assistance of Mr. Greer, the Deputy Commissioner of the district, who fully realised the importance of Dr. Cobb's proposal, and who did everything in his power as Chairman to advance the scheme, the Darjeeling Municipality towards the end of 1895 decided to adopt the Pasteur-Chamberland filter for their water-supply, and Messrs. Heatly and Gresham were entrusted with the work. These gentlemen have now completed their work, and we are informed that the filters are ready for use.

The filter consists of 38 cells of tough cast-iron lined with an acid-resisting composition and arranged in four rows. Each cell is connected by wrought-iron pipes to cast-iron mains, which deliver into cast-iron collecting mains, all of which are protected by a similar composition. The cells are fitted with gunmetal valves allowing any one cell or group of cells to be iso-

lated for cleaning or other purposes; a travelling crane allows of any cover to be readily taken off if required. Each cell contains a number of Pasteur filter tubes in the well-known form, fixed into a solid elastic block which forms an impermeable joint. The inlet and outlet pipes are controlled by valves in the ordinary way, and, by means of a small air compressor, the mechanical and bacterial soundness of each cell, or any group of cells, with their constituent filter tubes, can be immediately tested. This is owing to the circumstance, apparently peculiar to the remarkable medium of which the Pasteur tubes are composed, that, when soaked with water, the minutest invisible flaw will permit the passage of air under a pressure of 10lbs. to 15lbs. per square inch, while, if sound, it will retain it. The cleaning is effected by means of a circulating pump, fed from a small boiler fitted with Gresham's combination injector. This forces through the tubes of any cell or group of cells a solvent—usually a diluted acid,—by which the dialytic deposit in the pores of the filter tubes is removed, while the whole of the filtering system is sterilized, and as the acid can be used again and again, it is accordingly both economical and free from objection. Arrangements are also made for sterilizing by steam. The whole of the parts of the installation are interchangeable. The installation will be worked by one man, who could, indeed, attend to a much larger system. The tubes wear for practically an indefinite period; and the cost of upkeep is accordingly relatively small. It apparently only remains now for the system to be put into operation, and its effect on the water-supply and the health of the Darjeeling population to be carefully observed and recorded.

Medical News.

NEW PORT RULES.

To meet the wishes of Foreign Governments, and in order to comply with the recommendations of the Venice Conference, we understand that the Government of Bengal has submitted to the Government of India a series of rules, which they propose to apply to the Port of Calcutta. These rules, we understand, will apply to ships proceeding to ports outside of British India including Colombo, and involves compulsory individual medical inspection, by day, on shore, at the time of embarkation of each person sailing on the ship. The consular authority inter-

ested in the ship may be present at this inspection. There is to be also compulsory and rigorous disinfection on shore of every contaminated and suspected article and prevention of the embarkation of any persons showing symptoms of plague.

HEAVY MORTALITY IN BOMBAY.

It is with some concern that we observe the heavy mortality in Bombay which seems to be progressive, while the apparent recrudescence of plague adds to the uneasiness with which the situation may be viewed. We are glad to see that the Health Officer of Bombay, in protesting against the reduction of the plague establishment is fully alive to the probability of a recurrence of the disease in an epidemic form, and of the possibility that some portion of the high mortality may be due to this cause though unrecognised. We have no doubt that this vigilant attitude on the part of the authorities will go far to check the spread of the disease.

INDIAN MEDICAL CONGRESS.

THE question has been asked when the second Indian Medical Congress is to be held, and whether the meeting is to be in Bombay or Madras. It was settled, at the close of the first Congress in Calcutta, that the second should take place in Bombay. As regards time, if we remember rightly, the Bombay meeting was to be in 1898. It may be objected that the possible presence of plague a year hence in Bombay is against that city being chosen, but from a medical point of view this seems to us an additional reason for holding it there. We trust that those interested in the success of the coming Congress will begin to bestir themselves, so that there may be ample time for the necessary preparations. The haste with which these preparations had to be made for the first Congress contributed considerably to the difficulties which had to be overcome, and we trust, with the experience of 1894, nothing will be wanting to make that of 1898 even a greater success than its predecessor.

PAUCITY OF MEDICAL OFFICERS IN THE BENGAL SERVICE.

In connection with the views expressed in this Journal with regard to the condition of the Indian Medical Service, we draw attention to the following article on the Bengal Service which appeared in the *Englishman* of 2nd August:—

The Indian Medical Service in these provinces is having a particularly hard time of it at present. For months past all leave has been stopped in consequence of the prevalence of famine and plague, only those officers being granted furlough whom the Medical Board has pronounced to be

physically unfit to carry on their work. Five officers have had to leave the country temporarily on this account, two have been obliged to retire on medical certificate, and one died the other day at his post. Owing to the paucity of officers from causes such as famine and plague, which have claimed the services of all the spare men, it is not possible to fill these vacancies at present, and to add to the difficulties of the Inspector-General of Civil Hospitals, five of his junior officers were suddenly called away by the Government of India on Saturday, July 31st, for military duty at Meerut and Mian Mir, in consequence of the mobilization of troops in connection with the Malakhand rising and the Tochi Valley Expedition. From Calcutta, Surgeon-Captain Stevens, of the Eden Hospital, a son of the Lieutenant-Governor, has been taken away; the other four officers are Surgeon-Captain Vaughan, Deputy Sanitary Commissioner of the Western Bengal Circle, Surgeon-Captain Clarkson from famine duty in Behar, Surgeon-Captain Deare from the plague observation camp at Katihar, and Surgeon-Captain Oldham, Officiating Civil Surgeon of Mymensingh. The Bengal Medical Department is thus thirteen commissioned officers short of its sanctioned strength, and as the subordinate medical staff is also undermanned, it must be very perplexing to the head of the Department to know how to carry on the work of the civil medical administration.

LONDON LETTER.

THE Jubilee proceedings are ended and happily without disaster. Never, in the whole history of Great Britain, were the national feelings so acutely affected as on this occasion, and from one end of the Kingdom to another, these found vent in fêtes and rejoicings, processions, displays, feasts, bonfires and illuminations. London underwent a complete transformation. Its principal streets through which the Royal procession passed were placed beyond recognition by stands and boardings, bunting and baize, festoons of leaves, and flowers and gay decorations of every sort. But there was hardly a domicile in the whole of London, however poor or small, which did not hang out a flag or show a coloured light. The trains carried millions of people to and fro, and the thoroughfares were crammed with conveyances and pedestrians. Yet so admirable were the precautions adopted by the police and the Railway Companies that no accident of any importance occurred in any part of the Kingdom. The day of the procession was a very hot one, and the crowded streets stifling. Many cases of mild heat stroke occurred among both soldiers and spectators, but stretchers and ambulance wagons were at hand and every appliance ready for restoring the faint and reviving the weak.

The great Naval review at Spithead and Military review at Aldershot also passed off without a hitch, and the august personage in whose honour the celebration was held went through all the trying proceedings connected with it without faltering or fatigue. The newspapers have been full of *résumés* and reminiscences *usque ad nauseam*. The Medical press has not been wanting in this respect, and admirable pictures of medical and surgical progress during the last sixty years have been presented by the *Lancet*, *British Medical Journal*, the *Practitioner* and other journals. It is a marvellous tale and well worth the telling;—anæsthetics, antiseptics and the Roëntgen photography are probably the most dramatic elements in the narrative; but the birth and development of sanitation and preventive medicine constitute the most remarkable, valuable and fruitful outcome of the period.

The era has been noteworthy on account of two great controversies which have profoundly affected medical science and practice. The first was the change of type controversy. The abandonment of bloodletting and other spoliative and depletory measures in treating diseases was held by one school to be due to the advance of knowledge and the advent of more enlightened conception of what caused and constituted disease and of what was necessary to avert or cure. According to another school, represented by the older and more conservative men, the change in practice was considered to be owing to a degeneration in the constitution of human beings in consequence of which pathological processes presented a more asthenic complexion demanding support by food and wine rather than suppression by lancet, emetic and purge. The debate waxed warm, at times almost violent, but the result was that diseases were no longer treated, as malignant entities to be expelled by evacuants but as phases of disordered life to be rectified by time, rest, nursing and a careful and thoughtful encouragement and support of the *vis medicatrix naturæ*. Disease processes are now known to be in many, perhaps in most instances, to be conservative or recuperative in their action, and the rational treatment of disease in the present day tends to travel backwards along the path of causation and endeavour to keep the spring of life free of contamination at its origin and to prevent pollution of the stream as it proceeds by anxious attention to the environment. The other controversy in which the names of Pasteur and Pouchet were most prominent concerned the question of spontaneous generation which has been finally and absolutely set at rest by the ingenious experiments which have demonstrated anew the truth of the old doctrine—*omne vivum ab ovo*; and have opened the portal of the great and promising study of bacteriology. The creation *de novo* of living forms may have occurred in geologically remote epochs, but no such process takes place in the present day, and even

minor adaptive changes in the form and structure of living beings, caused by the force of evolution are slight in character and slow in manifestation. So that fortunately for us and our art we can still place reliance upon the great laws and uniformities of nature and eliminate from our thoughts and expectations all chance or probability of the startling apparition of novel beings even of microscopic dimensions.

I am glad to observe that both in India and in this country the necessity of a law of medical registration is being again urged. The public ought to be protected against incompetent practitioners, and the State ought to insist on competence founded on proper training and testing and to declare by means of an official register the names of persons who have obtained medical degrees and diplomas on conditions which ensure sufficient knowledge and skill in their possessors. Certainly no private body or association should be permitted to grant licenses to practise without State sanction conferred after taking guarantees of *bona fides* and soundness. My own firm opinion is that for the present the Indian Universities should be utilized as the instruments of testing and conferring medical qualifications; and that no medical college or school should be permitted to exist which is not affiliated to a university under conditions which should insist on proper arrangements and appliances being provided for teaching and training. It is contended that a diploma is wanted in India on easier terms as regards preliminary knowledge and special education and final examination than the Universities consider obligatory. I am convinced that the licenses of the Universities are granted on as easy terms as it is safe to concede, and that to lower medical education and the granting of diplomas to practise beneath that standard would be to degrade the profession and set loose incompetent practitioners.

It is argued that these find their way into practice in the shape of failed students notwithstanding, and that a cheaper diploma would bring many of these men into the fold of legitimacy. But, however low the standard is reduced, there will still remain the incompetent irregular practitioner who cannot be prohibited from practising as long as he manages to escape the clutches of the criminal law. It is vain to attempt to bring these men within any scheme of medical registration which should include only those who have obtained qualifications declared by the law to be sufficient to entitle their holders to practise the medical profession, fill public medical and sanitary appointments, grant certificates of health, sickness and death, sue for fees in Courts of law, give evidence as specialists, and generally perform such acts of a public or quasi-public character as may fall in their way; all unregistered practitioners or persons being held legally disqualified to fulfil such functions.

16th July 1897.

Transactions of Medical Society.

THE BOMBAY MEDICAL AND PHYSICAL SOCIETY.

THE usual Monthly Meeting of the Bombay Medical and Physical Society was held in the Durbar Room, Town Hall, on Friday, 11th June, 1897, at 4-30 P.M. Dr. Thomas Blaney was called to the chair.

ABSTRACT OF THE REPORT OF THE RUSSIAN PLAGUE COMMISSION.

By Prof. Dr. Wysockiewicz.

I believe that our colleagues of the Society will be pleased to hear an account of our experiences and researches in all what concerns the Plague before we leave Bombay. I submit this information with as much pleasure as I felt at the cordial reception accorded to us by our Indian colleagues, and by the Medical and Physical Society.

Although our researches are far from being completely terminated, we are already in possession of some facts which I am now going to place before my esteemed colleagues. The Russian Medical Mission at Bombay is composed of two members: Dr. W. N. Wysockiewicz, Professor of Pathology and of Pathological Anatomy, and Dr. Zabolotny, of Kiev.

Our labours have been confined to the treatment of the Plague with serum, to clinical, pathological, and anatomical researches, and, lastly, to the observation of the effects of treatment upon animals. We have worked in the hospitals at Grant Road, Charni Road, and, thanks to the sympathetic encouragement of M. Pilinski, Consul de France, we have been able to establish in his office our bacteriological laboratory. Subsequently we were provided with a laboratory at the Grant Road Hospital. In all we made 27 autopsies: 24 at Grant Road, 2 at Charni Road, and 1 at Parel. If to this we add the autopsies made by the Austrian Mission conjointly with us since the day of our installation at Grant Road, we can count 34 autopsies in all. Twenty-four were upon subjects dead from the Plague (17 at Grant Road, and 7 belonging to the Austrian Mission). The other cases refer to other maladies, such as phthisis, dysentery, pneumonia (croupous), &c.

In our autopsies upon corpses of the Plague, we discovered in 10 subjects inguinal buboes; 7 had buboes on the left side, 2 on the right side, and 1 on both sides. In 4 cases the buboes were axillary (2 on the right, and 2 on the left), one of them being accompanied by metastatic plague-pneumonia. In 4 other cases the buboes were on the neck, one of them with parotitis, and another one with complication of pneumonia.

In 6 cases we have encountered primary plague-pneumonia, and in one case complication with hepatitis, with necrogenic nodules.

In all the cases where there was a bubo the other lymphatic glands were also noticed enlarged. But nevertheless the primary bubo differed from the consecutive hyperplasias of all the other lymphatic glands, not only by its thickness, but by surrounding infiltration and its characteristic yellowish grey or deep red colour and yielding softness, and by the conglomeration of several glands forming a cluster. It was further distinguished by the fact that it contained an enormous number of specific plague bacteria. No other gland nor organ ever contains such a large number of bacteria as the primary buboes. The section of these buboes proved that the increase of the glands is rather due to the enormous number of bacteria than to hyperplasia of the tissues. The spleen contained also many bacilli, but not in such great numbers. In the other lymphatic hyperplastic glands there are more or less bacilli in the same number as are found in the blood. Having made this observation—the preponderance of bacteria in the primary buboes—it is not difficult to recognise the existence of primary bubonic pneumonia. Our attention to the study of pneumonia was directed by the valuable communication of Professor Childe, of Grant Medical College, and from our investigation we are prepared to state that plague pneumonia occurs in two forms, *viz.*, primary and secondary. When one finds very large quantities of bacteria exclusively in the pneumonic regions of the lungs, and in the bronchial glands which are enlarged, there is no reason to doubt the existence of primary pneumonia. In two of our cases, some peripheral buboes were accompanied by specific pneumonia as well as a pneumonia of the periphery of the lungs and bronchial glands, but in these cases the peripheral

position of the pneumonic nodules in the lungs, and the existence of thrombi in the veins (in the vicinity of the buboes), clearly explained the secondary production of these varieties of pneumonia. In plague-pneumonia, both primary and secondary, we find great quantities of plague bacteria in pure cultures or in combination with the pneumonic diplococci of Fraenkel, or with streptococci. The plague-pneumonia is characterised by nodules of infiltration of a mucoid aspect. Clinically it is often distinguished by an entire absence of cough and sputum.

Plague-pneumonia in all cases should be classed as *broncho-pneumonia*, and in all prolonged cases there is a tendency towards a confluence of these several patches of pneumonia one with another, but in such a manner as to form circumscribed areas of exudation in the midst of healthy tissue.

In no case have we observed pneumonia involving a whole lobe of the lung, as it happens in fibrinous pneumonia. The bronchial mucous membrane was injected, varicled, and covered sometimes with blood. In the throat and in the trachea the mucous membrane is nearly always healthy. In the pleura we have nearly always remarked, as in non-pneumonic plague cases, numerous punctiform hemorrhages. Some complications which are often noticed are hemorrhages in the stomach and in the large intestine, but rarely in the small intestine. The mesenteric glands were always swollen, but did not present the aspect of primary buboes, and did not contain large quantities of plague bacilli. In some cases instead of hemorrhages we have noticed some superficial ulcers, and in a single case we have observed two deep ulcers of the cecum. In this case we also observed a characteristic modification of the liver, which presented numerous small grey nodules of necrosis accompanied with an increase in size of the organ.

In all cases we have only been able to distinguish two forms of the plague,—firstly, *the plague with buboes* (of the extremities or of the neck), secondly, *the plague without external buboes*, under the type of *primary plague-pneumonia*.

In no instance have we encountered primary infection by the stomach or by the intestines, either when conducting autopsies, or in our clinical researches. The intestinal manifestations always presented the character of secondary troubles, after the manner of intoxication or of septic plague, which likewise was almost always secondary. Never have we observed the bacilli in the blood before 24 hours before death. In carrying on the autopsies of the bodies, it was difficult to trace the ways of penetration of the virus found in the glands and in the lungs. In scarcely any case did we discover local abrasions of the skin or modification of lymphatic vessels (lymphangitis), although in all cases of bubonic plague the penetration of the virus is supposed to have been through the skin; hence it will be necessary to prove this assertion. We have found some proofs in *experiments made on monkeys*. Our original experiments on monkeys have shown us that these animals are very amenable to the virus of the plague. When a little culture of the plague was introduced under the skin of the arm of the monkey, one or two days after inoculation there was observed a rise in temperature to 40.5 or 41.5 centigrades (the normal temperature being 38.5 C), and the formation of an axillary bubo corresponding to the swelling at the seat of puncture. The monkeys thus inoculated died after 4 or 5 days from the malady, and after death they showed all the characteristic features observed in man. In the primary buboes enormous numbers of bacilli were met with, often as many as, but mostly in a greater number than, in the rat, and many also in the blood—many more than in man or in the mouse.

From our experiments, we are convinced that the plague is produced in monkeys in all cases by infection. We have made some experiments of infection with very small doses of bacilli by means of a single puncture made with a needle charged with the bacillus of the plague. All the monkeys (5) infected in this way on the palm of the hand died after 3 to 7 days with buboes, with all the symptoms of the plague; but in these cases we did not observe, neither during the course of the malady, nor at the autopsy, any visible alterations at the seat of introduction of the virus. In monkeys infected in this manner by a puncture of a needle in the foot, the death occurred after a longer time (10 days), with inguinal buboes and retroperitoneal manifestations, as in man, but always without local lesions at the seat of inoculation. The result of our experiments is very interesting, because it does not leave any doubt on this point, as in man—the infection by the skin can develop itself without producing any lesion apparent at the point of inoculation of the virus.

After having finished these experiments, we believed that we could study better on monkeys than on other animals the influence of the treatment with serum, and the efficacy of preventative inoculations. Our researches in this direction, and of which we have utilized 96 monkeys, have demonstrated to us that:—

1stly. Yersin's serum can cure affected monkeys, the curative treatment of which has been commenced within two

days after subcutaneous infection, and after the symptoms of the plague have clearly evinced themselves—viz., the rise of the temperature, buboes, etc.

2ndly. That the treatment with the serum is not efficacious if commenced too late, *i. e.*, 24 hours before the death of the monkey.

3rdly. That the quantity of serum required to guarantee the cure of the monkey is not very large, more or less 20 c.c. of active serum in $\frac{1}{16}$ m.

4thly. That when the serum injected is very weak, or when the curative treatment is undertaken too late, one can sometimes succeed in curing, but oftentimes the relief is only temporary, and followed by a relapse, which brings about the death of the animal after 15 or 17 days.

5thly. That the immunity conferred by preventive inoculation of 10 c.c. of Yersin's serum, or 5 c.c. of Haffkine's prophylactic, does not last beyond 10 or 14 days.

6thly. That the immunity resulting from preventive inoculation made with agar-agar cultures warmed to 60° centigrade is not produced before 7 days, but this immunity lasts for a longer time; a monkey inoculated by this method, and infected 21 days after inoculation, did not show any symptom of the plague, and survived the infection.

7thly. When one injects a large quantity of warmed agar-agar culture, the animal gets enfeebled, and is liable to catch the plague.

8thly. That it is possible to infect monkeys by the channel of respiration, by introducing plague cultures into the trachea by means of a tube during chloroform-narcosis. They die within two to four days, presenting the signs of typical plague-pneumonia.

9thly. That in this case of experimental pneumonia, only small quantities of bacilli are found in the blood, as in the rat, while large numbers are observed in the parts of the lungs which are affected, as well as in the bronchial glands. This phenomenon is also noticed in man.

10thly. That monkeys are very susceptible to infection by the mouth; and that, on the contrary, in another case, we have introduced by means of a tube agar cultures into the stomach of a narcotised monkey without obtaining any result.

11thly. That the species of monkeys that we have met with here show a slight difference in their susceptibility to the plague. The brown monkeys (*Macaca*) die 4 or 5 days after infection; the long tailed, black faced monkeys (the *Entellus* Monkey or 'Lungoor') die more rapidly, in 2½ or 3 days.

12thly. That the serum prepared at the Institute of Experimental Medicine of St. Petersburg has given the same result.

13thly. That in cases where the monkeys died after a prolonged illness, the buboes softened and bacilli degenerated. In man we have sometimes observed that in the buboes which transform themselves into abscesses neither bacilli or plague nor other bacteria were found. It was *pure softening* without bacteria.

Immediately on our arrival in Bombay, it was debated whether the blood of man recovering from the plague possessed the property of agglutinating plague bacilli. This agglutination power manifests itself only towards the end of the seventh day of the malady, increases during the second, third and fourth week, and then gradually diminishes. The blood . . . during the acute stage, and of the . . . first week, does not possess this . . .

Respecting the treatment of the plague by Yersin's serum, I must say that in several cases I have observed most interesting and striking results from it. After inoculation the temperature falls, the somnolence and delirium disappears, and the patient enters the convalescent state. On the whole, the results have not been so encouraging as we had hoped, but they have, however, reduced the mortality by 40% in treated cases. Our experiments have taught us that the serum possesses an undoubted efficacy. We must explain the high mortality thus. The first cause is that the patients were taken to the hospital too late, that is, three, or four, or five days after the malady had manifested itself. The second is our ignorance of the duration of the malady, which does not operate with the same intensity in every case; some die within twenty-four hours after attack, while others linger for twenty-four days. A third cause is that men display different degrees of sensibility to inoculation, which is more uniform in monkeys. In the cases of plague-pneumonia it is often the presence of other bacteria, pneumococcus and streptococcus, which explains the difficulty of obtaining a cure by means of the serum. We should hope to obtain better results with the anti-toxin serum which Dr. Roux is preparing; that which has been used up to now has actually shown a power more *bactericidal* than *anti-toxic*. Even should the remedy save only one life in a hundred, it is sufficient to encourage observation and further study. The serum of Yersin has saved a greater number of men, and I must warmly recommend this mode of treatment.

The serum remains up to now as the only remedy to be employed in the treatment of the bubonic-plague.

A NOTE ON PLAGUE IN COORLA.

(By Surgeon-Major A. V. Anderson.)

WHEN I started plague work in Coorla, I got together rather a scratch lot of inspectors, and my workmen for all purposes, dooly-bearers, shed builders, &c., varied from 4 to 15; and they came and went at their own sweet will. In disinfecting houses I found the removal of earthen floors gave much trouble with my available staff, and as that should be well done or not at all, I thought it better to rely on disinfecting the floor in the same way as the walls and roof of the rooms. After all the floor in a native house is usually the smoothest and best attended to part of it. I sprayed the walls, roof and floor with phenyle solution well, and then had the whole limewashed, paying particular attention to the floor, and kept the house empty and open for at least ten days. Of 175 houses in Coorla in which plague cases have occurred and which have been vacated and disinfected, 123 have up to this time been reoccupied, and in only one of these has a plague case occurred, *i. e.*, only one house of the 123 has had to be re-vacated. Almost all these houses and huts had earthen floors, and the point in the above is the necessity or otherwise of removing the floor. You Bombay people with your European inspectors and unlimited workmen may consider this a small matter, but in villages and small towns where labour is sometimes unobtainable it is of some importance. No other case occurred among the people after their second removal, so the case may have been infected from an outside source.

I may mention another point bearing on rats, and the advantage of speedy removal of a whole community from an affected locality. Although the first local case reported from Coorla occurred on the 2nd of January 1897, there is no doubt the disease was there in December 1896, as the total mortality for that month was 53, of which only 4 were shown as imported plague deaths compared with 28 in December 1895, and an average monthly mortality of 25 (the population is 11,500). By the way the above bears on the question of interval between 1st imported and 1st local case which Dr. Grayfoot is going into. If he relies on dates of first cases as reported by village officers and municipal secretaries, his conclusion won't be worth much, I fear. But to hark back to my story. As isolation and segregation had not been carried out by the time I went to Coorla on the 19th February, the disease had got a firm hold of the whole town except the Kasai Wala (a small community beyond the railway), Old Coorla Village and Coorla Bazaar. The last two are at the extreme west end of Coorla, and separated from the rest of the town by an open space of about 400 yards, and are again about 200 yards distant from each other. In spite of the vacuation of houses and the chawls and the segregation of the healthy in chappars, and the removal of sick to hospital (most of the cases, for some time, were only discovered after death), the disease, though to a less extent, still continued in the old affected parts of the town and followed the people in their chappars, and occasional cases are still occurring in the town.

On 4th April rats were found dead in Old Coorla in the most easterly house, that is, the house nearest the affected part of Coorla (400 yards off). The only plague case that up to this time had occurred in Old Coorla was a Hindoo priest from Bombay, who died in an isolated hut at the western end of the town on 14th February. The hut had been disinfected and never re-occupied, so death of the rats six weeks afterwards at the opposite extremity could scarcely have had any connection with this imported case. However, on the death of the rats I cleared out and disinfected that house and the six adjoining ones, which form an angle of the village and sent the people to live in chappars, and at the same time I warned the people of Old Coorla Village to be in readiness to move out at once. On the 8th April two plague cases occurred in Old Coorla Village, and within 24 hours the whole population, amounting to 2,000, had left the town and gone into sheds in the jungle. They are a Christian community, and their priest had helped me in persuading them. Three cases occurred in the sheds within a week after their removal, and since then the Old Coorla Village community has been free. On the other hand, in Marole Village (of 1,700 inhabitants), about 4 miles from Coorla, the disease existed for some time before they reported it—the first six or seven deaths being recorded as being due to fever. These people are all out in chappars now, scattered about the jungle, but the disease sticks to them. Disinfection of the whole community and its goods and chattels is doubtless the correct remedy, but the hunting down and isolation of cases as they occur is all that can be done practically.

P. S.—In Bombay, I believe, you merely dig up the floor and leave it.

Surgeon-Lieut.-Colonel CLARKSON writes:—We all want to know I think the various ways in which plague can be communicated. It is through clothing, through careless handling of evacuations of people sick, or through inhalation; any, or all, or how? I heard of a case in which it seemed to me infection was carried by the person and transmitted, but it may have been by other means. An old woman went from Hotgi to Bombay to nurse her son ill of the plague. He died, she returned to Hotgi where she stayed with her son-in-law, three other women, and two children. She took ill and died, and two of the women and one child died, and a relative from a house close by, who is said to have come over and helped to nurse, was attacked and died. Then the Assistant Collector came down, turned the people out and burnt both houses. No other cases.

PLAGUE IN SIND.

(By Surgeon-Lt.-Col. Henderson.)

Plague first made its appearance in Karachi about the 10th of December; doubtless cases occurred previously, which escaped notice of the authorities. These cases were imported by Bombay people who were anxious to conceal the disease, having themselves suffered the inconveniences attendant on detection. In each locality in Sind in which the plague has become epidemic, it has been preceded by imported cases and it is very certain there is a period of local incubation, a term of hatching as it were, in which the germ appears to brood prior to attaining the full virulence of its force. In Hyderabad, Patta and Sukkur, this has invariably been the case. I was present both in Hyderabad and Karachi when the disease first made its appearance in epidemic form, and I have no doubt that there as in other places, the disease was imported by human agency.

The question arises why does a certain period elapse between the introduction of the disease and its becoming epidemic. It would almost appear that the imported cases were not capable of propagating infection. Looking for a cause, I consider that rats are, if not the only, at any rate the principal means, of spreading the disease. In other words, I consider human agency the means of importation and rats the disseminating agent. It is well-known that these animals are peculiarly susceptible to plague, and the imported infection, not sufficiently strong to infect man, is sufficiently so to infect rats, who then scattered broadcast over the surrounding area, become each a separate centre of infection. In Karachi the city railway premises, which were under my charge, were entirely free from infection until dead rats were found in the warehouses adjoining the servants' quarters. A few days after this cases of plague occurred among the railway employees. In Hyderabad I find, after careful investigation, that the appearance of local cases immediately succeeded the appearance of infected dead and dying rats. I do not say that the disease might not become epidemic without such agency, but from my own observation I believe that the time of local incubation is as a rule the time between the importation of a case and the infection of the rats.

Shortly after giving over charge of the Karachi prison (in which from the moment of plague becoming epidemic I successfully instituted the most stringent quarantine regulations) one case occurred. The man had been in prison for five months, and I can account for this solitary case in no other way than the probability of the infected rats having had access to this man's food.

In Hyderabad the disease became epidemic in the beginning of March, or rather local cases occurred amongst the inhabitants. Soon a whole quarter of the town became infected. From the first the disease has been vigorously combated by the only means capable of stamping it out—by isolation of the sick and segregation of the healthy. Here 543 cases have occurred, out of which 370 have been treated in hospital. As far as possible, all members of infected families have been segregated, infected areas have been vacated, and all roads carefully guarded, to prevent the removal of the sick and the spread of the infection to the surrounding district. It is only to be regretted that these stringent measures were not in the beginning extended to the management of the imported cases. Thirty-seven occurred since January and were not interfered with; the occurrence of local cases was the inevitable result.

I do not propose to enter into any detailed account of the epidemic or give any description of individual cases. We have had examples of the disease of the ordinary type with buboes, cases affecting the throat, the abdomen, and a large number of cases of the pneumonic form. In conclusion, I would only allude to the fact that it has been most marked the manner in which women have recovered from attacks, the percentage of recoveries being about 50 as compared with 20 in males.

Current Medical Literature.

MEDICINE.

DIABETES MELLITUS AND LESIONS OF THE PANCREAS. (By R. T. WILLIAMSON, M.D. *The Medical Chronicle*).—As Medical Registrar of the Manchester Royal Infirmary, Dr. Williamson has made good use of his opportunities to investigate the relations of pancreatic disease to diabetes mellitus. In this paper he gives brief abstracts of the clinical and *post-mortem* notes of 23 consecutive cases of diabetes mellitus, in 22 of which he examined the pancreas microscopically. This examination of the minute structure of the organ is most important, because the naked eye appearances may show little or no deviation from the normal. Of these 23 cases the pancreas appeared normal in 8, both microscopically and macroscopically, and in 4 the atrophy was merely proportionate to the general wasting of the body. In these 12 cases it is probable, therefore, that the cause of the diabetes mellitus was not connected with the pancreas, unless a hypothesis of functional or vasomotor change in the pancreas is adopted; but the facts are against this theoretical explanation. In 2 cases a tumour of the pituitary body was ascribed as the probable cause of the disease.

In 8 of the 9 remaining cases there was good reason to believe that diabetes resulted from disease of the pancreas.

Cirrhosis, atrophy, fatty degeneration and infiltration were the chief morbid conditions of the pancreas found in these cases. Cancer of the organ existed in one case, and in two calculi were found.

Dr. Williamson is of opinion that "in certain cases diabetes is directly due to pancreatic disease." In support of his own observations he adduces elaborate statistics compiled by himself, by Hansemann from the reports of the Berlin Pathological Institute, and by Kasahara. But the most convincing evidence is that derived from experimental researches, such as those of Minkowski and Von Mering.

Experiments on animals show that "total removal of the pancreas invariably produces diabetes, and that a small portion of pancreatic tissue grafted under the skin of the abdominal wall is sufficient to prevent diabetes, when the whole gland is removed from within the abdomen."

ACCURATE DIAGNOSIS OF DISEASES OF THE CHEST. (By S. H. HABERSHON, M.D., F.R.C.P.).—In *St. Bartholomew's Journal* for May there is reprinted a most instructive lecture delivered by Dr. Habershon at the Abernethian Society.

In discussing the influence of posture on cardiac murmurs the importance of examining the heart in the recumbent as well as in the erect attitude is emphasised.

This is generally recognised with regard to cardio-respiratory or exo-cardiac murmurs; but Dr. Habershon asserts that both mitral systolic and presystolic murmurs are frequently rendered more apparent in the recumbent position. The exceptions to this are cases in which emphysema of the lungs or dilatation of the right side of the heart are superadded. "It is an important point in the difficult diagnosis between the slapping beat of an irritable heart in women, which so often simulates the so-called presystolic murmur, and an imperfectly marked murmur of mitral stenosis. Make your patient lie down, and in some cases you will find that in the former the heart becomes less excited and irritable, and the resemblance to a true murmur disappears; while in the latter the slapping first sound now becomes preceded by an unmistakable bruit. I believe the explanation is that the vigour of heart is greater when the patient is at rest and free from fatigue, and a certain vigour of cardiac contraction is necessary to produce a murmur at all."

RESULTS OF HAFFKINE'S ANTI-CHOLERA INOCULATIONS IN INDIA. (By ANDREW DAVIDSON, M.D. *Janus*).—After detailing the striking results obtained from the use of M. Haffkine's stronger vaccines on people inoculated in Calcutta and in Cachar, Dr. Davidson reiterates the conclusion that these inoculations afford protection for not more than a year or eighteen months, and he gives the following explanation in support of this conclusion:—"It is constantly observed in India that villages or districts which have suffered extensively from cholera in a given year are spared for a year or two, even should a severe epidemic of the disease be raging all around, or if they suffer at all, it is only to a trifling extent. After a lapse of two or three years, however, such a community is once more as liable to be attacked as ever. Just as the immunity conferred by a previous attack of declared cholera or of choleraic diarrhoea is only temporary, so is the protection afforded by inoculations. It may not be practicable to maintain the whole population of an endemic area immune by repeated inoculations; but Haffkine's method will prove of inestimable value as a means of protecting bodies of men, such as European troops, temporarily stationed in a region where cholera is endemic, and will also be applicable to communities exposed only to occasional visitations of the epidemic disease."

CARBOLIC ACID POISONING. (By J. DIXON MANN, M.D., F.R.C.P.). (*The Medical Chronicle*).—Dr. Dixon Mann draws attention to the great and increasing frequency in Great Britain of suicidal deaths due to carbolic acid, and to the relatively large proportion of females who adopt this means of destroying themselves.

"Since 1890, when the total number of suicides due to carbolic acid was 43, the number of

deaths thus caused has increased year by year, until at the end of five years it is augmented more than five-fold. In the year 1895, 347 males committed suicide by poison; of these 114 resorted to carbolic acid, leaving 233 to be apportioned among the 25 remaining poisons which were used; apart from a number of suicides by poison in which the kind of poison is not specified. In the same year 233 females committed suicide by poison; of these 110 resorted to carbolic acid, leaving only 123 for the remaining poisons which were used; again apart from a number not specified. It will thus be seen that *one-third of the males and very nearly one-half of the females who poisoned themselves in 1895 did so with carbolic acid.*"

Thus there were 224 suicidal deaths from carbolic acid in 1895, whereas the poison which stood second in frequency was opium, from which the deaths amounted only to 68 in the same year.

Corresponding statistics for India, were such reliable or available, would prove an interesting contrast. It is probable that opium would head the list, that arsenic would stand second, and that the two together would account for far more suicides in India than all other poisons combined.

MALARIAL HÆMATURIA. (By J. W. MEEK, M.D. *The Therapeutic Gazette*).—Dr. Meek strongly condemns the use of quinine in malarial hæmaturia. In his experience quinine "not only fails to arrest the paroxysm but aggravates every symptom, and adds greatly to the mortality of the disease." He advocates the exhibition of hyposulphite of sodium in malarial hæmaturia, and he is accustomed to prescribe it in "drachm doses every two hours until the patient is thoroughly purged; then continue in smaller doses until the system is saturated with it."

SIMPLICITY AND PALATABILITY IN PRESCRIBING. (By DR. A. L. BENEDICT. *The Therapeutic Gazette*).—"To sum up, the writer would advocate: (1) the use of drugs according to known physiological actions, except when scientific ignorance and clinical experience render empiricism necessary and proper; (2) the use of one medicine at a time, unless co-existing pathological processes demand more; (3) the prescribing of medicines separately unless it is reasonably certain that their conjoined administration will be safe and agreeable, and that their relative doses will remain stationary; (4) the administration of disagreeable medicines in solid form, so that they may be swallowed untasted unless physiological activity will be sacrificed; (5) the application of common sense rules according to habits of eating and drinking, in administering medicines whose taste cannot be avoided by insolubility in the mouth. This last means that we shall not mix bitter and sweet things unless the bitter can be almost completely

covered; that we shall transform acids into lemon or orange-ades or into "shrub" drinks; that we shall salt oily substances and not sweeten salty ones: that we shall respect idiosyncracies; that when a taste cannot be covered, we shall not try to mix it, but shall rely on rinsing out the mouth or establishing a pleasant after-taste."

D. M. MOIR, M.A., M.B.

OBSTETRICS AND GYNÆCOLOGY.

ON POSTERIOR-OCCIPITAL POSITIONS OF THE FETAL HEAD. (*American Practitioner and News*).—Stewart suggests the following points of management. Should the position be diagnosed early, before rupture of the membranes, the object to be attained is engagement of the head in the flexed condition. To attain this bring the dorsum of the child forward by abdominal manipulation. If the head be disengaged the position is at once changed to occipito-anterior, but if engaged the rotation of the trunk alone and its retention in this position, he considers, a strong factor in promoting the subsequent rotation of the vertex. Should dilatation of the cervix be well advanced and the anterior fontanelle low, the artificial rotation of occiput is to be assisted by pressing in front the fontanelle with two fingers in the vagina (thus promoting flexion) and at the same time pushing the sinciput backward; in some cases he has succeeded by the introduction of the whole hand into the vagina, in grasping the occiput and bringing it forward. If the labour be far advanced and the head arrived extended at the pelvic floor, axis-traction forceps are to be applied and a combined traction and flexion exercised. This is to be attained by lifting the application handles of the instrument well forward, and at the same time pulling the head in the direction of its long axis, a procedure which necessitates the wide separation of the traction rods from the shanks. The forceps are thus converted into a lever of that class in which the power is between the weight and the fulcrum. The shanks held well forward in the one hand, represent the fulcrum; the child's head between the blades, the weight, and the other hand of the operator acting through the traction rods, the power.

DIAGNOSIS AND TREATMENT OF RUPTURE OF THE UTERUS. (*B. M. J.*).—Ludwig insists on the valuelessness of individual symptoms, such as collapse, bleeding, sudden and severe pain, recession of the formerly fixed presenting part, cessation of pains, &c. He has found the best diagnostic signs to be: (1) in lateral rupture the interruption of the natural contour of the uterine quadrant, either a projection or a nodule being formed; (2) abnormal mobility of the uterus, and (3) emphysematous crackling at the seat of rupture. If the head presents and

can be pushed back, bimanual examination under deep narcosis should lead to a certain diagnosis. With regard to treatment, delivery may be effected *per vias naturales* or by laparotomy. The former is indicated when a large part of the child is already fixed in the pelvis, and also when the diagnosis of uterine rupture cannot be made for certain before delivery. In cases in which the child remains in the uterus after the rupture or has only partially passed into the abdominal cavity, delivery *per vaginam* is only to be preferred when it can be carried out without losing time or increasing or complicating the tear—for instance in head presentations and the absence of contraction of the pelvis, also where rupture takes place during an operation. Laparotomy is indicated when the whole child has passed into the abdominal cavity, when the passages are not fully dilated, in contracted pelvis, in severe hæmorrhages, and in injuries to the neighbouring organs. In partial passage of the child into the abdomen or with a living child still in the uterus, Cæsarean section is the correct procedure when natural delivery would take too long and be fraught with danger to the mother. As regards treatment after delivery of Ludwig's nine cases—three came into the hospital and were operated on—two by supra-vaginal amputation, and one by abdominal hysterectomy; all recovered. The remaining six were treated outside—five were operated on, four by supravaginal amputation, one by abdominal hysterectomy—of which one recovered and four died of sepsis. There was no death from hæmorrhages except in the remaining case which was not subjected to operative interference.

ABORTION AND QUININE. (*B. M. J.*).—Schwab in seven cases of retained placenta after abortion gave a gramme of quinine divided into two "cachets" at ten minutes' interval— $7\frac{7}{10}$ grs. at a dose. The results were encouraging. As a rule, the placenta was expelled in four hours and a half by the stimulation of the uterine muscular fibres caused by the drug. In several instances the pains had ceased for hours. Hence the action of quinine was positive. No bad results were observed and no tetanic contractions occurred.

ECLAMPSIA. (*American Journal of Obstetrics*).—J. C. Edgar prefers chloroform, veratrum viride and chloral, in the order named, for the control of the convulsions. He believed that morphine prolongs the post-eclamptic stupor and interferes with eliminative processes. If the pulse is strong and rapid, veratrum viride is the most certain means for controlling convulsions. When the pulse is weak he employs morphine hypodermically, chloroform by inhalation, and chloral by rectum, with stimulation, if necessary. He considers rapid manual dilatation of the os and subsequent extraction of the

foetus advisable as a rule; but if the internal os has disappeared and the external remains rigid, while the labour must be rapidly terminated, he favours four clean incisions from the edge of the os to the utero-vaginal junction. In performing manual dilatation, if the cervix is unyielding, a cervical dilator of gauze or a hydrostatic bag should be used until a slight relaxation of the cervix occurs. In the meantime veratrum viride is most valuable to reduce pulse rate and temperature, relax the cervix and cause prompt diaphoresis and diuresis. The child should not be extracted before the external os is completely dilated and paralyzed as rupture of the lower uterine segment or death of the child may occur. The ordinary methods of increasing the action of the eliminative organs are advised. As a diuretic, nitroglycerine is preferred to veratrum viride, and for diaphoresis, the hot-air bath to the hot pack. Edgar has found inhalation of oxygen of great value as a general stimulant, to aid elimination from the lungs and to prolong life during the stage of coma.

KEDARNATH DAS, M.D.

Vital Statistics & Sanitation.

RESOLUTION ON THE REPORT OF THE LAHORE AND DELHI LUNATIC ASYLUMS FOR THE YEAR 1896.

(Continued from page 279.)

3. Judging from the figures quoted on the margin* which give the daily average strength of criminal lunatics in the Lahore Asylum for each of the past five years, it would appear that this class of patient is steadily, if almost imperceptibly, on the increase. They now number nearly one quarter of the population of the Asylum. The total population in the Lahore Asylum of lunatics tried and acquitted on the ground of insanity was 13 in 1893, 17 in 1894, 13 in 1895, and 18 in 1896. A difficulty having been experienced in properly supervising the criminal lunatics owing among other causes to structural defects in the present Asylum buildings, an extra expenditure for warders has been sanctioned as a temporary measure pending the decision that may be arrived at in respect to the proposed new Central Asylum. The criminal population of the Delhi Asylum remains of much the same strength as in former years, and criminals constitute less than one-ninth of the population of this Asylum.

4. The year under review was a healthier one for the Lahore Asylum than it has recently enjoyed. There was no special visitation of malaria as in 1894 or of pneumonia as in 1895. There were fewer admissions into hospital than in these two years, and the death-rate per cent. of daily average strength fell to 7.66, or 4.22 less than the average of 11.88 for the past ten years. The general healthiness of the year and the absence of epidemics among the general population of the country likely to effect the inmates of the Asylum may have had a great deal to do with this favourable state of things. At the same time it seems only reasonable to suppose that the greater care shown for the comfort of the lunatics in providing them with an extra meal and a warm jersey may have played a not unimportant part in the general improvement in health. As regards the continued prevalence of bowel complaints, which has been attributed to the propensity of lunatics to eat the earth in

the walls and floors, it was suggested in the review on the Report for the year 1895 that perhaps special arrangements could be made to prevent this. It is now reported that the practice is so exceedingly common among inmates that to segregate them so as to prevent them from getting at earth is practically impossible. It appears to the Lieutenant-Governor that much depends on the character of the Asylum buildings. In preparing the plans for the proposed new Asylum the desirability of furnishing a certain number of cells with *pukka* floors and walls *pukka* up to a certain height should be borne in mind, as this is probably the only effectual means of checking the unwholesome habit.

5. At the commencement of the year 1896 there were 108 inmates (80 males, 28 females) in the Delhi Asylum; at the end of the year there were 126 (92 males, 34 females), giving an increase of 18. The total population of the Asylum was, however, much the same as in the two previous years.† The daily average strength for these years was 105.14, 111.23 and 118.22, respectively, against an average daily strength of 98.86 for the past ten years. But here again, as in the case of the Lahore Asylum and for similar reason, the year under review was an unusually healthy one. Indeed it was exceedingly so, there having been but 4 deaths, giving a death-rate of 3.39 per cent. only of the daily average strength against 9.02 for 1895 and 11.82 for the previous decade. Of notice as being the smallest ever recorded. The percentage of cures to daily strength was, however, considerably less than in the year 1895 and in the previous decade, the figures being 10.15 for 1896, 17.93 for 1895 and 19.32 for past ten years. It would be well to consider whether any reasons can be assigned for the difference of the year under review, and this subject should have been discussed in the Report. *Prima facie* the year having been so very healthy a higher percentage of recoveries might have been anticipated from the healthy influences of the body on the mind.

6. Mr. Mackworth Young regrets to find that the reports in respect to watch and ward are still unsatisfactory. An explanation should be furnished showing how it was that the criminal lunatic who escaped from the Lahore Asylum during the night was not missed until the early morning. The escape of three criminal lunatics from the Delhi Asylum can only be characterised as extremely unsatisfactory, and the Lieutenant Governor will be glad to have detailed reports as to the manner in which these escapes were effected. It is to be feared that neither of the two Asylums is sufficiently secure to provide against the escape of that more astute type of lunatic to which criminals, classed as insane by the Courts, not infrequently belong. His Honor observes that it is stated that the warders concerned were severely punished. He would be glad to know to what extent each one was responsible, and the punishment inflicted in each case.

7. In both Asylums there was considerable increase of expenditure per lunatic, which the Lieutenant-Governor considers is satisfactorily accounted for by

condition of things that necessitated a large increase in both Asylums, and in the Lahore institution a charge for clothing and blankets purchased in 1895 had to be adjusted in 1896. A special expenditure sanctioned in the Government letter No. 289, dated 4th June 1896, for the purchase of stores for the comfort of old and weak patients was also incurred. In the case of the Delhi Asylum it is stated that an excess of Rs. 242-4-11 in establishment charges over the figure for the year 1895 is due to "increase of establishment." This remark is not understood, as the letters from the Civil Secretariat noted on the margin sanctioned revisions of establishment which resulted in a decrease of Rs. 4 per mensem in establishment charges. A comparison of Statement No. X in the Report for the year 1896, with the similar statement in the Report for 1895, will show that effect was apparently given to this reduction; as the total cost for establishment for the year 1896 is shown as Rs. 310 per mensem against Rs. 314 in the previous year. It is also not understood why a "prisoner cook" on Rs. 5 per mensem, who was shown in the Proposition Statements attached to the correspondence connected with the letters quoted above, has not been shown in Statement X of the Report. The Inspector-General is requested to be so good as to obtain and submit the necessary explanations. One of the reasons for the revision of establishment was to increase the pay of the warder establishment in view to inducing a better class of men to seek service as warders. It is stated in the Report that "the better rates of pay have enabled the Superintendent to get a somewhat better class of men" but the matter of the escapes referred to above seems to corroborate the further remark in the

Paragraphs 12 to 18, 39 to 41 and 45.

1894 ..	167
1895 ..	163
1896 ..	161

Paragraphs 25 to 27 and 53 and 56.

Paragraphs 16 to 49 and 52.

§No. 833 C., dated 23rd April 1895. No. 123 S., dated 6th June 1896.

Paragraphs 37, 38, and 42 to 44.

1894 ..	517
1895 ..	492
1896 ..	367

Report that "there is much room for improvement." It may be true that until the asylum warders are put on the same footing as jail warders it will be difficult or impossible to get good men to serve; but the matter, His Honor observes, is hardly one for consideration in connection with an Annual Report. It is a matter for separate discussion should this be found desirable.

8. The Lieutenant-Governor is very glad to observe that the question of occupying the lunatics of both Asylums in employment of a healthy kind continues to engage attention and with apparently satisfactory results on the whole. It is especially pleasing to note that the garden at Delhi is in a very prosperous condition. There may be difficulties in making labour of the kind remunerative at Lahore, but looking at the peculiar suitability of work of the kind as recreative employment for the insane, and considering that the great object is not so much profit as to find really healthy employment, His Honor trusts with reference to the remarks in paragraph 7 of the review on the Report for the year 1895 that the Superintendent of the Lahore Asylum will see that the inmates are put to gardening work as much as possible.

THE VENICE CONVENTION OF 1897.

GENERAL RULES FOR THE PREVENTION OF THE INTRODUCTION AND SPREAD OF THE PLAGUE.

CHAPTER I.

MEASURES TO BE TAKEN OUT OF EUROPE.

I. NOTIFICATION.

THE Government of each country which adheres to the present convention will notify to the Governments of the other countries, by telegram, the appearance of any case of plague in their territories in accordance with section I, chapter II, "measures to be taken in Europe." Sections 2, 3 and 4 of the same chapter are also applicable out of Europe.

It is also desirable that the measures prescribed for countries in Europe in order to keep the signatories of the convention informed of an outbreak of the plague, and also the means adopted to prevent its propagation, and importation into uninfected countries, should be applied in other countries.

II.

SANITARY MEASURES FOR SHIPS SAILING FROM INFECTED PORTS.

MEASURES APPLICABLE BOTH TO ORDINARY VESSELS AND TO PILGRIM SHIPS.

1. Compulsory individual medical inspection, by day, on shore, at the time of embarkation, during such period as may be necessary, by a doctor appointed by public authority, of each person sailing on the ship.

The Consular authority interested in the ship may be present at this inspection.

2. Compulsory and rigorous disinfection, on shore, under the superintendence of a doctor appointed by public authority, of every contaminated or suspected article in the manner prescribed in paragraph 5, chapter III of the annexure to this convention.

3. Prevention of the embarkation of any person showing symptoms of plague.

PILGRIM SHIPS.

1. When there is plague in the port, embarkation on board pilgrim ships must not take place, until the pilgrims collected in groups have been subjected to an inspection sufficient to ascertain that none of them are suffering from plague.

It is to be understood that in carrying out this measure each Government may take into account local considerations and conditions.*

2. Pilgrims must possess the means absolutely necessary for the accomplishment of the pilgrimage, for the voyage out and for the return voyage and for the sojourn in the holy places, if local circumstances permit of this rule being enforced.

MEASURES TO BE TAKEN ON BOARD PILGRIM SHIPS.

SECTION I.—General Rules.

Art. 1.—The following regulations are applicable to pilgrim ships which carry Muhammadan pilgrims to or from the Hedjaz or the Persian Gulf.

Art. 2.—A ship is not to be considered a pilgrim ship although, in addition to her ordinary passengers, among whom

* The Conference has decided, for instance, that, in the Dutch Indies, this inspection may be made on boardship at the time of departure.

may be included pilgrims of the upper classes, she carries pilgrims of the lowest class in a less proportion than one pilgrim per 100 tons gross.

Art. 3.—Every pilgrim ship, on entering the Red Sea and the Persian Gulf must conform to the instructions contained in the *Rules specially prescribed for the pilgrimage to the Hedjaz* which will be published by the Constantinople Board of Health, in accordance with the principles laid down in the present convention.

Art. 4.—Steamers only are permitted to carry pilgrims on long voyages. The carriage of pilgrims by other ships on such voyages is prohibited.

Pilgrim ships, on coasting service, intended for short passages, called "coasting voyages," must obey the instructions contained in the special rules mentioned in article 3.

SECTION II.—Measures to be taken before departure.

Art. 5.—The captain, or in default the proprietor or agent of every pilgrim ship, is bound to declare to the appointed authority⁽¹⁾ of the port of departure his intention to embark pilgrims, at least 3 days before departure. This declaration must state the proposed date of departure and the destination of the vessel.

Art. 6.—On receipt of this declaration, the appointed authority will proceed, at the expense of the captain, to inspect and measure the vessel. The Consular authority interested in the ship may be present at this inspection.

The inspection need not be performed if the captain is already furnished with an official certificate of measurement, unless it is believed that this document no longer corresponds to the actual state of the vessel.

Art. 7.—The appointed authority must not permit the departure of a pilgrim ship until he has satisfied himself:—

(a.) That the ship has been thoroughly cleaned and if necessary, disinfected.

(b.) That the ship is in a condition to undertake the voyage without danger; that she is properly manned, equipped and ventilated, and provided with a sufficient number of boats; that there is on board nothing that is, or is likely to become, injurious to the health or safety of the passengers; and that the upper and lower decks are of wood, or of iron sheathed in wood.

(c.) That there is on board, properly stowed away, over and above the rations for the crew, sufficient food and fuel for all the pilgrims, during the declared duration of the voyage.

(d.) That the drinking water is of good quality and from a source protected from contamination; that it is in sufficient quantity; that the tanks for drinking water are safe from all contamination and so closed that the distribution of water can only be made by taps or pumps.

(e.) That the vessel carries a condenser, capable of distilling a minimum quantity of 1 gallon of water, per diem, for every person on board, including the crew.

(f.) That the ship possesses a disinfecting stove, certified to be safe and efficacious.

(g.) That, in accordance with the rules laid down in articles 11 and 23, the vessel carries a diplomaed and licensed doctor, (2) appointed either by the Government of the country to which she belongs, or by the Government of the port where the pilgrims embark, and that she carries medical stores.

(h.) That the deck is free from merchandise and all encumbrances.

(i.) That the arrangements on board are such as to allow of the measures prescribed in section III being carried out.

Art. 8.—The captain will cause notices, in the languages commonly spoken by the pilgrims, to be posted up in a conspicuous place, accessible to all concerned, showing:—

1. The destination of the ship.

2. The daily ration of food and water allowed to each pilgrim.

3. The price of articles not included in the daily ration, which can be procured on extra payment.

Art. 9.—The captain must not start without having in his possession:—

1. A list, countersigned by the appointed authority, showing the name, sex, and total number of pilgrims he is authorised to carry.

2. A Bill of Health, stating the name, nationality and tonnage of the ship, the name of the captain and of the doctor, the exact number of persons embarked—crew, pilgrims and other passengers—the nature of the cargo and the port of departure.

The appointed authority will note on the certificate whether or not the authorized number of pilgrims has been

(1) The appointed authority is: in British India, an officer appointed on this behalf by the Local Government (Native Passenger Ships Act, 1887, article 7); in the Dutch Indies, the captain of the port; in Turkey, the sanitary authority; in Austro-Hungary, the port officer; in Italy the captain of the port; in France, Tunis and Spain, the sanitary authority; in Egypt, the sanitary, quarantine, etc., authority.

(2) Except in the case of Governments without licensed doctors.

embarked, and in the latter case, the additional number of passengers the vessel is authorized to embark at subsequent ports of call.

Art. 10.—The appointed authority will take stringent measures to prevent the embarkation of any suspicious person or article (1), in accordance with the rules laid down for precautions to be taken in ports.

SECTION III.—Precautions to be taken on the voyage.

Art. 11.—Every ship embarking pilgrims should have on board a licensed doctor, appointed by the Government of the country to which the ship belongs, or by the Government of the port, where the pilgrims are embarked. A second doctor should be carried when the number of pilgrims exceeds 1,000.

Art. 12.—The doctor must inspect the pilgrims, tend the sick, and see that sanitary rules are observed on board. He must, in particular—

1. Satisfy himself that the rations issued to the pilgrims are of good quality, and of the quantity agreed on, and that they are properly cooked.

2. Satisfy himself that the rules in article 20, regarding the distribution of water, are observed.

3. If not satisfied as to the quality of the drinking water, call the attention of the captain, in writing, to the rules in article 21.

4. Satisfy himself that the vessel is always kept clean, and particularly that the latrines are cleaned out, in accordance with the directions in article 18.

5. Satisfy himself that the pilgrims' quarters are kept healthy, and, in case of the occurrence of infectious disease, that disinfection is carried out in the manner prescribed in article 19.

6. Keep a diary of all sanitary matters during the voyage and submit this diary to the appointed authority at the port of arrival.

Art. 13.—The vessel must be capable of accommodating the pilgrims in the between decks.

Over and above the space required for the crew, the ship must contain at least sixteen superficial feet and a height between decks of at least six feet of space available for each person irrespective of age. In coasting vessels, each pilgrim must be allowed a space at least six-and-a-half feet wide along the gunwales.

Art. 14.—During the voyage the deck must be kept free from encumbrances; it must be reserved, night and day, for the passengers, and placed, without charge, at their disposal.

Art. 15.—The heavy baggage of the pilgrims must be registered, numbered and placed in the hold. Pilgrims may only keep with them such articles as are absolutely necessary.

The nature, quantity and dimensions of such articles will be decided by each Government for its own ships.

Art. 16.—The between decks must be carefully washed and rubbed with dry sand, mixed with disinfectants, every day while the pilgrims are on deck.

Art. 17.—On each side of the ship, on deck, a place should be set apart, screened from view and provided with a hand-pump, to supply sea-water, for the use of the pilgrims. One such place should be exclusively reserved for women.

Art. 18.—The ship must be provided, in addition to the latrines for the crew, with water-closets in a minimum proportion of one per hundred passengers. Some latrines must be reserved for women.

No closets must be allowed between decks or in the hold. The latrines allotted to the passengers, as well as those of the crew, must be kept clean, and should be flushed and disinfected three times a day.

Art. 19.—The ship must be disinfected in accordance with the instructions in paragraphs 5 and 6 of chapter III of the annexure to this convention.

Art. 20.—At least 1 gallon of drinking water must be issued daily to each pilgrim, irrespective of age, free of charge.

Art. 21.—If there is any doubt, as to the quality of the drinking water, or as to the possibility of its pollution either at its source or during the voyage, it must be boiled or otherwise sterilized, and the captain is responsible for seeing that it is thrown overboard, at the first port of call, where it is possible to procure a purer supply.

Art. 22.—The ship must have two cabooses or cooking ranges provided for the use of the pilgrims. The pilgrims should be forbidden to light fires elsewhere, especially on the deck.

Art. 23.—Each ship must carry such medicines and medical stores as are necessary for the treatment of the sick. The rules drawn up for pilgrim ships by each Government will determine the nature and quantity of such stores. Attendance and medicines must be provided for the pilgrims free of charge.

Art. 24.—A hospital properly fitted up, and constructed with due attention to health and safety, must be reserved for the accommodation of the sick. It should be capable of accommodating at least 5 per cent. of the pilgrims on board

and should provide for each patient a space of 32 square feet. (1).

Art. 25.—The ship must be provided with the means of segregating persons attacked by plague.

The persons charged with the care of plague patients may alone have access to them, and the sick must not be brought into contact with the other passengers.

All bedding, carpets and clothes which have been in contact with the sick should be immediately disinfected.

The observance of this rule is specially enjoined in the case of the clothes of person attending the sick, which may have been contaminated.

Those of the abovementioned articles which are not valuable should be thrown overboard, if the ship is not in harbour or in a canal, or else burnt.

Other articles should be carried to the stove in impermeable bags, washed in a solution of corrosive sublimate.

The excreta of patients must be received in vessels containing a disinfecting solution. These vessels should be emptied into the latrines, which must be rigorously disinfected each time.

The patients' quarter must be rigorously disinfected.

The disinfection must be carried out in accordance with paragraph 5, chapter III, of this convention.

Art. 26.—In the event of a death occurring during the voyage, the captain must enter the fact opposite the name of the deceased, on the list countersigned by the appointed authority at the port of departure, and must also enter in the log the name of the deceased, age, place of residence, supposed cause of death according to the medical certificate and date of death.

In the event of a death from infectious disease, the corpse, wrapped in a shroud, impregnated with a solution of corrosive sublimate, must be thrown into the sea.

Art. 27.—The Bill of Health given at the port of departure must not be altered during the voyage.

It must be countersigned at each port of call by the sanitary authorities, who should enter:—

1. The number of passengers disembarked or embarked at the port.

2. Anything that has happened at sea affecting the life or health of the passengers.

3. The state of the health of the port of call.

Art. 28.—At each port of call, the captain must cause the list drawn up in accordance with article 9 to be countersigned by the appointed authority.

In the event of a pilgrim disembarking during the voyage, the captain must note the fact on the list, opposite the pilgrim's name.

In the case of persons embarking, their names must be entered on the list in accordance with article 9. This must be done previously to the list being countersigned by the appointed authority.

Art. 29.—The captain must see that all sanitary preventive measures taken during the voyage are entered in the log. This document is to be submitted by him to the appointed authority at the port of arrival.

Art. 30.—The captain must pay all sanitary charges, which should be included in the price of the tickets.

SECTION IV.—Penalties.

Art. 31.—Any captain convicted of a breach of his contract for the supply of water, food or fuel, will be liable to a fine of 2 pounds Turkish (2). This fine will be paid to the

(1) See chapter IV, section 1, articles 1 and 2 of this convention.

The Conference having learned the nature of the hospital accommodation which must be provided, in accordance with Rule 53 of the rules framed under the Pilgrim Ships Act by the Government of India, recommends their adoption in substitution for article 24.

Extract.—The hospital accommodation shall be provided on the upper deck either in the poop or in a deck-house. A permanent hospital shall be provided containing not less than six bunks, and having a deck area of at least 144 superficial feet and dimensions of not less than 864 cubic feet. On every pilgrim ship on which there are 50 or more female pilgrims there shall be a separate permanent hospital, containing not less than two bunks with a deck area of at least 72 superficial feet and dimensions of not less than 288 cubic feet, which shall be reserved for the use of women and children under 10 years of age. The hospitals shall be lighted and ventilated to the satisfaction of the Inspector and shall be provided with permanent raised floors or platforms at least 4 inches off the deck. They shall be made as secure as any other deck-house, and the roof shall be well caulked and covered with painted canvas. No case of small-pox, cholera, yellow fever or plague shall on any account be treated in a permanent hospital.

Materials shall be carried for the construction on the upper deck of a separate temporary hospital for the treatment of such cases of sickness as it may be considered desirable specially to segregate (such as small-pox, cholera, yellow fever or plague). The part of the upper deck upon which such hospital shall, if required, be erected shall be pointed out by the Inspector. It shall be constructed on the same principles as the permanent hospital, and the superficial area of the floor shall not be less than 144 square feet.

(2) A Turkish pound is of the value of 22½ francs.

pilgrim who has suffered from the breach of contract on proof that he demanded its fulfilment without effect.

Art. 32.—Any infraction of article 8 is punishable by fine of 30 pounds Turkish.

Art. 33.—Any captain, who commits, or knowingly allows to be committed, any fraud with respect to the list of pilgrims, or of the Bill of Health prescribed in article 9, is liable to a fine of 50 pounds Turkish.

Art. 34.—Any captain, arriving without a Bill of Health from the port of departure, or without its being countersigned at the ports of call, or being unprovided with the prescribed list, duly kept up according to articles 9, 27 and 28, is liable, in each case, to a fine of 12 pounds Turkish.

Art. 35.—Any captain convicted of having, or of having had, on board, more than 100 pilgrims, without the presence of a licensed doctor, in accordance with the rule in article 11, is liable to fine of 300 pounds Turkish.

Art. 36.—Any captain convicted of having, or of having had, on board, more pilgrims than he was authorized to carry, in accordance with the rules in article 9, is liable to a fine of 5 pounds Turkish for each pilgrim in excess of the authorized number.

The disembarkation of the pilgrims in excess of the authorized number must be effected at the first station where there is a appointed authority, and the captain must provide the pilgrims so disembarked with sufficient money to enable them to reach destination.

Art. 37.—Any captain convicted of having disembarked pilgrims at a place other than their destination, unless with their consent, or from unavoidable cause, is liable to a fine of 20 pounds Turkish for each pilgrim thus disembarked.

Art. 38.—All other infractions of the present rules are punishable by a fine of from 10 to 100 pounds Turkish.

Art. 39.—Any offence reported during the voyage should be entered in the Bill of Health, and in the list of pilgrims. The appointed authority will submit an official report on the offence to the proper authorities.

Art. 40.—In Turkish ports the offence is tried before and the fine imposed by the appointed authority, in accordance with the rules in chapter V of this Convention.

Art. 41.—All agents required to assist in the execution of these rules are liable to punishment for any breach of them according to the laws of their respective countries.

Art. 42.—These rules must be posted up in the language of the nationality of the ship, and in the languages commonly spoken by the pilgrims in a conspicuous and accessible place on board every pilgrim-ship.

III.

MEASURES TO BE TAKEN TO PREVENT THE IMPORTATION OF PLAGUE.

1.—BY LAND.

The measures to be taken, on land, with respect to travellers and goods from regions infected with plague, should conform to the sanitary principles laid down in this convention. Modern methods of disinfection should be substituted for land quarantine.

For this purpose stoves and other means of disinfection should be established at selected posts on the routes followed by travellers. Similar methods should be adopted on railways, constructed or in course of construction. Merchandise should be disinfected according to the principles adopted by this convention.

Each Government is at liberty to close its frontiers to passengers and goods.

2.—BY SEA.

A.—MEASURES TO BE TAKEN IN THE RED SEA.

Art. 1.—Healthy Ships.—(a.) After the medical inspection, ships passed as healthy, will be allowed to proceed at once, whatever the nature of the Bill of Health.

The ship must, however, have completed, or must complete, ten full days from the date of departure from the last infected port at which she has touched.

The only treatment the authorities of the port of arrival may apply to such ships, consists in the measures prescribed for suspected ships (medical inspection, disinfection of soiled linen, pumping out the bilge water, and substituting good drinking water for that stored on board).

(b.) *Ordinary healthy ships* will be allowed to pass through the Suez Canal in quarantine. They will complete in the Mediterranean the 10 days' period of observation. Ships carrying a doctor and a stove will not be disinfected before the passage in quarantine.

Art. 2.—Suspected ships.—*Suspected ships* are those on board of which there have been cases of plague at the time of departure, or during the voyage, but no new case for 12 days. Such ships will be treated in a different manner according as to whether or not they have on board a doctor and a disinfecting apparatus (stove).

(a.) *Ships having a doctor and disinfecting apparatus (stove)* fulfilling the required conditions, will be allowed to pass through the Suez Canal, in quarantine, in accordance with the rules prescribed for the passage.

(b.) *Suspected ships*, having neither doctor nor disinfecting apparatus (stove) on board, will, before being allowed to pass through the Canal, in quarantine, be detained at Moses Wells for the time necessary to disinfect soiled linen, personal linen and other susceptible articles, and to ensure that the ship is in a sanitary condition.

Passage in quarantine will be permitted in the case of a mail boat, or steamer specially adapted for passengers, without a disinfecting apparatus (stove), but with a doctor on board, if the local authority is satisfied by an official statement, that sanitary measures and measures of disinfection have been properly carried out, either at the time of departure, or during the voyage.

Free pratique may be given at Suez, after disinfection, in the case of mail boats or steamers specially adapted for passengers without a disinfecting apparatus (stove) but with a doctor on board, if the last case of plague took place more than 14 days before the date of arrival and if the sanitary state of the ship is satisfactory.

In the case of a steamer having a healthy passage of less than 14 days, passengers for Egypt will be disembarked at Moses Wells and isolated for the time necessary to complete 10 days; their soiled linen and personal effects being disinfected. They will then obtain *free pratique*. Steamers having a healthy passage of less than 14 days and requiring *free pratique* for Egypt will be detained at Moses Wells for the time necessary to complete 10 days; they will undergo the prescribed disinfection.

Art. 3.—Infected ships, that is to say, those with plague on board, or on which cases have occurred within 12 days. These are divided into ships with a doctor and disinfecting apparatus (stove), and those without a doctor, and without a disinfecting apparatus (stove).

(a.) *Ships without a doctor and a disinfecting apparatus (stove)* will be detained at Moses Wells, and persons suffering from plague will be disembarked and segregated in a hospital. The disinfection will be thoroughly carried out. The other passengers will be disembarked, and isolated in as small groups as possible, so that if plague breaks out in one group, the whole party will not be affected.

The soiled linen, personal effects and clothes of the crew and passengers, and the ship, will be disinfected.

It is to be understood that this does not require the discharge of the cargo, but only the disinfection of that part of the ship which has been infected.

The passengers will remain 10 days at the quarantine station at Moses Wells; when the cases of plague have occurred several days previous to arrival, the term of segregation will be diminished and will vary according to the date of the occurrence of the last case.

Thus, if the last case occurred 9, 10, 11 or 12 days before arrival, the term of observation will be 24 hours; if it took place 8 days before arrival, the observation will be for 2 days; if it took place 7 days before arrival it will be for 3 days; and so on according to the table given below.

(b.) *Ships with a doctor and disinfecting apparatus (stove).*—Ships with a doctor and disinfecting apparatus will be detained at Moses Wells.

The ship's doctor will state, on oath, what persons on board are suffering from plague. These patients will be disembarked and segregated.

After their disembarkation, the soiled linen of the other passengers and of the crew will be disinfected on board.

If the plague has only attacked the crew, the disinfection will be confined to the soiled linen and bedding of the crew.

The ship's doctor will also declare, on oath, the portion or compartment of the ship occupied by the patient or patients, and the section of the hospital to which they were removed.

He will also state, on oath, what persons have been in contact with the plague patients, since the appearance of the malady, either directly or by contact with objects capable of transmitting infection. These persons only will be considered as *suspected*.

The part or compartment of the ship, and the section of the hospital in which the patients have been located, will be thoroughly disinfected. By "the part of the ship" is meant the cabin of the patient, the adjoining cabins, the passage to these cabins, the deck, and the parts of the ship in which the patient or patients have been lying.

If it is impossible to disinfect the part or the compartment of the ship, which has been occupied by persons attacked by the plague, without disembarking the persons declared to be *suspected*, these persons will either be put on another ship specially set apart for this purpose, or will be disembarked and detained in the quarantine buildings, but not in contact with the patients, who will be placed in the hospital.

The duration of this detention on board, or on land, for the purpose of disinfection, will be as short as possible, and must not exceed 24 hours.

The suspected persons will be kept under observation either on their own ship, or on a ship provided for this purpose; the duration of this observation will vary according to the following table :—

When the last case of plague occurred on the 12th, 11th, 10th or 9th day before arrival at Suez ...	The observation will be for 24 hours
If it has occurred on the 8th day before arrival at Suez ...	2 days.
If it has occurred on the 7th day before arrival at Suez ...	3 "
If it has occurred on the 6th day before arrival at Suez ...	4 "
If it has occurred on the 5th or 4th day before arrival at Suez ...	5 or 6 "
If it has occurred on the 3rd or 2nd day before arrival at Suez ...	7 or 8 "
If it has occurred on the 1st day before arrival at Suez ...	9 "

Passage in quarantine may be permitted before the expiration of the periods stated in the above table, if the sanitary authority deems it possible; it will, in any case, be permitted on the completion of the disinfection, if the ship leaves behind, in addition to the sick, the persons classed above as suspected.

A pontoon, with a stove on board, may be brought alongside the ship to hasten the process of disinfection.

Infected ships seeking *free pratique* in Egypt will be detained for 10 days at Moses' Wells, dating from the last case on board, and will undergo the prescribed disinfection.

The time taken in disinfecting is included in the term of observation.

Organization for carrying out the measures of observation and disinfection at Suez and at Moses' Wells.

1. The medical inspection, prescribed by the Regulations, of every ship arriving at Suez will be made by one of the doctors of the station. Arrivals from infected ports will be inspected by day.

2. There will be 7 doctors—a Principal Medical Officer, 4 doctors and 2 assistants. Should this Medical staff be found insufficient, the services of the naval doctors of the different Powers will be utilized, under the orders of the Principal Medical Officer of the sanitary station.

3. The medical officers must have a regular diploma, and should be selected from amongst those who have gone through a special course of epidemiology and bacteriology.

4. They will be appointed by the Minister of the Interior on the recommendation of the Sanitary, Maritime, and Quarantine Board of Egypt.

5. The pay of the assistants will be at the rate of 6,000 francs a year, the pay of the four doctors will be at the rate of 8,000 francs a year rising to 12,000 francs, and the pay of the Principal Medical Officer will rise from 12,000 to 15,000 francs.

6. The disinfecting and quarantine station of Moses' Wells is under the authority of the Principal Medical Officer at Suez.

7. When patients are disembarked at this place, two of the Suez doctors will be posted there, one to tend the plague patients, the other to tend persons not suffering from the plague.

8. The number of sanitary guards will be 20. One of them will be in special charge of the disinfecting apparatus at Moses' Wells.

9. The disinfecting and quarantine station of Moses' Wells will be provided with—

1. At least three disinfecting stoves, of which one will be placed on board a pontoon.

2. A new segregation hospital containing 12 beds, for the sick and suspected.

This hospital will be so arranged that the sick and suspected, and men and women, can be separately segregated.

3. Barracks, hospital tents, and ordinary tents, for the use of the persons disembarked.

4. A sufficient number of baths and washing places.

5. The buildings required for the usual offices, the medical staff, the guards, etc.; a magazine and a laundry.

6. A reservoir for the water-supply.

The passage, in quarantine, of the Suez Canal.

1. Permission to pass the Canal in quarantine is granted by the sanitary authority at Suez; the Board must be immediately informed when such permission is given. In doubtful cases, the decision rests with the Board.

2. A telegram must be at once sent to the authority appointed by each Power. The telegram will be sent at the expense of the ship.

3. Each Power will prescribe penal rules for those vessels, which depart from the course declared by the captain, and enter without license one of the ports of that Power. Exception will be made in the case of absolute necessity or if the vessel is compelled to put into port for shelter.

On arrival the captain must declare if he has on board gangs of native stockers, or hired servants, of any description not included in the roll of the crew, or the register kept for the purpose. The following questions will be put to the captains of all ships arriving at Suez from the south and must be answered on oath :—

Have you any supernumeraries, stockers or other hands not included in the ship's roll or in the special register? What is their nationality?

Where did you embark them?

The sanitary doctors must satisfy themselves as to the presence of these supernumeraries, and if they find that any of their number are missing, they must inquire carefully into the cause of their absence.

4. A sanitary officer and two sanitary guards will go on board, and accompany the ship as far as Port Said; their duty is to prevent communication, and to see to the execution of the measures prescribed for the passage of the Canal.

5. Passengers may embark at Port Said, in quarantine, but all embarkation and disembarkation, and all transfer of passengers or cargo, is forbidden during the passage of the Canal from Suez to Port Said.

6. Ships passing, in quarantine, must make the journey from Suez to Port Said without tying up.

In case of the vessel running aground, or being compelled to tie up, the necessary operations must be carried out by the staff of the ship, all communication with the staff of the Suez Canal Company being avoided.

Transports passing through in quarantine must do so only by day.

If they are compelled to pass a night in the Canal, they must anchor in Lake Timsah.

7. Ships passing in quarantine are forbidden to stop at Port Said, except in the cases provided for in paragraphs 5 and 8. The operation of re-ventilating must be carried out with the means on board.

All stevedores and other persons who have come on board the ship will be isolated on the quarantine pontoon. Their clothes will there undergo the prescribed disinfection.

8. When it is absolutely necessary for ships, passing in quarantine, to coal at Port Said, they must do so at a place to be fixed by the Sanitary Board, where the necessary isolation and sanitary supervision can be secured. When effective supervision is possible, and all contact with the people on board can be avoided, the coaling may be done by the labourers of the port. At night, the place must be lighted by the electric light.

9. The pilots, electricians, agents of the Company and sanitary guards will be disembarked at Port Said, outside the port, between the jetties, and from thence, will be taken direct to the quarantine pontoon, where their clothes will be thoroughly disinfected.

Measures to be taken in the case of ships arriving in Egypt from an infected port by way of the Mediterranean.

1. Ordinary healthy ships, coming from a European or Mediterranean infected port, wishing to pass the Suez Canal, will be allowed to do so in quarantine. They will continue their voyage, remaining under observation for ten days.

2. Ordinary healthy ships, wishing to land in Egypt, can put in at Alexandria or Port Said, where the passengers will complete the period of observation, either on board, or in the Lazaretto of Gabari, as the local sanitary authority may direct.

3. The measures to be taken as regards infected and suspected ships, coming from an infected European or Mediterranean port, and desiring to call at an Egyptian port, or to pass the Suez Canal, will be settled by the Sanitary Council, in accordance with the regulations adopted by this Convention.

These measures, must, before they can be carried out, be accepted by the different Powers represented on the Board. They will regulate the conditions to be imposed with regard to ships, passengers and goods.

The Board will, similarly, submit to the Powers, a code of rules dealing with cholera.

These two codes should be submitted as soon as possible.

SANITARY SUPERVISION OF PILGRIMS IN THE RED SEA.

Sanitary rules for pilgrim ships from infected ports in the (reorganized) sanitary station of Kamaran.

Pilgrim ships coming from the south, and bound for the Hedjaz, will be detained at the sanitary station of Kamaran, and then undergo the following treatment :—

Ships declared healthy will, after medical inspection, and on completion of the operations detailed below, be given *free pratique*.

The pilgrims will be disembarked, they will wash or take a bath in the sea; their soiled linen, and any portion of their personal effects or baggage, open, in the opinion of the sanitary authority, to the suspicion of being contaminated, will be disinfected. The duration of these operations, including the disembarkation and embarkation, should not exceed 72 hours. If no case of plague is reported during the operations, the pilgrims will be re-embarked immediately, and the ship will proceed to the Hedjaz.

Suspected ships, that is to say, those which have had a case of plague on board, at the time of departure or during the voyage, but no fresh case for 12 days, will be treated as follows; the pilgrims will be disembarked; they will wash or take a bath in the sea; their soiled linen, and any portion of their personal effects or baggage, open, in the opinion of the sanitary authority, to the suspicion of being contaminated, will be disinfected; the bilge water will be pumped out; and the parts of the ship inhabited by the sick will be disinfected.

The duration of these operations, including the disembarkation and embarkation, should not exceed 72 hours. If no case of plague is reported during the operations, the pilgrims will be immediately re-embarked, and the ship will proceed to Jeddah, where a second medical inspection will take place on board. If the result is favourable, and the ship's doctor declares on oath that there has been no case during the passage, the pilgrims will be at once disembarked.

If, on the contrary, cases of plague have occurred during the voyage or on arrival, the ship will be sent back to Kamaran, where she will undergo the treatment for *infected ships*.

Infected ships that is to say, those having cases on board, or having had them within 12 days, will undergo the following treatment:—

The plague patients will be disembarked and segregated in the hospital. The disinfection will be thoroughly carried out. The other passengers will be disembarked and isolated, by groups, as small as possible, so that if the plague breaks out in one group, the whole party will not be affected.

The soiled linen, the personal effects, and the clothes of the crew, and passengers, and the ship, will be disinfected.

The local sanitary authority will declare if the discharge of the heavy baggage and cargo is necessary, and if the whole ship must be disinfected, or a portion only.

The passengers will remain at Kamaran for 12 days; when the cases of plague occurred several days before arrival, the period of isolation may be diminished and it may vary according to the date of occurrence of the last case, and the orders of the sanitary authority.

The ship will then proceed to Jeddah, where a strict individual medical examination will take place on board. If the result is satisfactory the pilgrims will be disembarked. If, on the other hand, plague has appeared during the voyage, or on arrival, the ship will be sent back to Kamaran, where she will again undergo the treatment for *infected ships*.

Improvements to be made in the station of Kamaran.

A.—Complete evacuation of the Island of Kamaran by its inhabitants.

B.—Measures to ensure safety, and to facilitate navigation in the bay of the Island of Kamaran:—

1. Provision of buoys and beacons in sufficient numbers.

2. Construction of a principal mole or quay for the disembarkation of passengers and baggage.

3. A separate pier for the embarkation of the pilgrims of each encampment.

4. A steam tug and sufficient barges for the disembarkation and embarkation of the pilgrims. The disembarkation of pilgrims from *infected ships* will be carried out with the appurtenances on board.

C.—The establishment of a sanitary station, which should contain:—

1. A system of railways, connecting the wharves with the head-quarters of the Administration, the places for disinfection, and the places where the different offices and encampments are situated.

2. Quarters for the Administration and for the staff employed in the sanitary and other offices.

3. Buildings for the disinfection and washing of wearing apparel and other articles.

4. Buildings where the pilgrims can wash or take sea baths, whilst their clothes are being disinfected.

5. Separate and completely isolated hospitals for both sexes:—

(a) For the observation of *suspected persons*.

(b) For plague patients.

(c) For patients suffering from other contagious diseases.

(d) For ordinary patients.

6. The encampments should be completely separated from each other, the distance between them being as great as possible; the pilgrims' quarters should be constructed on the most approved sanitary principles, and must not contain more than 25 persons each.

7. A well situated cemetery, distant from all habitations, free from sub-surface water, and drained 20 inches below the level of the graves.

D.—Sanitary appliances:—

1. Steam disinfectors in sufficient number, constructed with due regard to safety, efficacy and rapidity.

2. Cinerators, disinfecting stoves and the necessary appliances for chemical disinfection, as described in chapter III of the annexure to this convention.

3. Condensing machines; apparatus for the sterilization of water by heat; ice machines.

A system of pipes and reservoirs for the distribution of drinking water, which should be closed, and only capable of being used by means of taps or pumps.

4. A bacteriological laboratory with the necessary staff.

5. An arrangement of portable vessels for the reception of faecal matter after disinfection. Sewage farms for the disposal of faecal matter on the part of the island most distant from the encampments, arranged with due regard to their proper sanitary working.

6. An arrangement for the removal of dirty water from the encampments, which must prevent its stagnation and its use for drinking purposes. The dirty water of the hospital should be disinfected, with slaked lime, according to the instructions contained in chapter III of the annexure to this convention.

E.—The provision by the sanitary authority in each encampment of a store for food and fuel.

The tariff of prices fixed by the appointed authority should be hung up in several places in the encampment, in the languages commonly spoken by the pilgrims.

The doctor of the encampment will be responsible for the daily control of the quality and quantity of the provisions.

Water should be provided free of charge.

Improvements to be made in the sanitary stations of

Abu-Said, Vasta, and Abu-Ali.

1. Selection of two plague hospitals, for men and women, at Abu-Ali.

2. Selection at Vasta of a hospital for ordinary cases.

3. Construction at Abu-Said and Vasta of masonry barracks, capable of containing 50 persons each.

4. Three disinfecting stoves to be placed at Abu-Said, Vasta, and Abu-Ali, with laundries and accessories.

5. Washing places to be provided at Abu-Said and Vasta.

6. Condensers to be provided on each of the islands of Abu-Said and Vasta, capable of distilling 15 tons of water per diem.

7. The rules for cemeteries, faecal matter, and dirty water will be the same as for Kamaran. A cemetery should be provided on one of the islands.

The rules with regard to the supply of food and water at Kamaran prescribed under heading *E* above will be applied to the encampments of Abu-Said, Vasta, and Abu-Ali.

It is desirable that the arrangements at Abu-Said, Vasta, and Abu-Ali should be completed as soon as possible.

Reorganization of the sanitary station of Jebel-Tor.

The Conference confirms the recommendations and views expressed on previous occasions and leaves to the Sanitary Board the duty of carrying out the improvements. The Conference also considers:—

1. That it is necessary to supply the pilgrims with good drinking-water, either from a local source or by distillation.

2. That it is desirable that all food imported by pilgrims from Jeddah and from Yembo, when there is plague in the Hedjaz, should be disinfected as a suspected commodity, or completely destroyed, if it appears to have deteriorated so as to have become dangerous.

3. That steps should be taken to prevent pilgrims bringing with them leather bottles from Jebel-Tor. They should be replaced by earthenware vessels or by metal cans.

4. That each section should be provided with a doctor.

5. That a Port Officer should be posted at El-Tor to superintend embarkation and disembarkation, and to see that the rules are observed by the captains and sarangs of the vessels.

6. That, during the pilgrim season, only pilgrims should be detained in observation at Jebel-Tor.

7. That the village of Kouroun should be evacuated.

8. That the encampment of Jebel-Tor should be connected by telegraph with the sanitary station of Suez.

Rules for the Arabian ports of the Red Sea during the pilgrim season.

Sanitary rules to be applied to pilgrim ships coming from the North.

1.—THE OUTWARD VOYAGE.

If plague is not reported to exist at the port of departure or in its neighbourhood, and if no case has occurred during the voyage, the ship is immediately given *free pratique*.

If the plague is reported to exist at the port of departure or in its neighbourhood, or if a case has occurred during the voyage, the ship will be subjected at Jebel-Tor to the rules prescribed for ships which come from the south and stop at Kamaran.

2.—THE HOMEWARD VOYAGE.

Art. 1.—Any ship coming from a port of the Hedjaz or from any other port on the Arabian coast of the Red Sea, infected with plague, having on board pilgrims or any similar collection of persons, bound for Suez or for a Mediterranean port, must proceed to El-Tor, there to undergo the prescribed observation as detailed below.

The disembarkation and disinfection of passengers, baggage and susceptible goods will then be effected, as well as the disinfection of personal effects and of the ship.

Art. 2.—Ships bringing back pilgrims will only be allowed to pass through the Canal in quarantine. Egyptian pilgrims after leaving El-Tor must disembark at Ras Mallap, or some other place appointed by the Sanitary Board, there to undergo 3 days' observation and a medical inspection, before being given *free pratique*.

In the event of a suspicious case occurring on board during the voyage from El-Tor to Suez, the ship will be repulsed to El-Tor.

Art. 3.—Agents of Navigation Companies and captains of ships are warned, that, after the completion of the observation at the sanitary station of El-Tor and at Ras Mallap, only Egyptian pilgrims will be permitted to leave the ship, in order to return to their homes. Certificates of residence, issued by an agent of the company, and in accordance with the prescribed form, will be recognized as Egyptian or as residents of Egypt. Specimens of this form will be deposited with the consular and sanitary authorities of Jeddah and Yembo where agents and ships' captains can inspect them.

Non-Egyptian pilgrims, such as Turks, Russians, Persians, Tunisians, Algerians, Moors, etc., may not, after quitting El-Tor, be disembarked in an Egyptian port. Navigation Companies' agents and captains are, therefore, warned that the transshipment of non-Egyptian pilgrims, either at Tor, Suez, Port Said, or Alexandria, is forbidden.

Vessels having on board pilgrims belonging to the nationalities mentioned in the preceding paragraph will be treated according to the rules for non-Egyptian pilgrims, and will not be permitted to enter any Egyptian Mediterranean port.

Art. 4.—If it is not reported that plague exists in the Hedjaz, or has existed during the pilgrimage, vessels will be subjected, at Jebel-Tor, to the rules prescribed at Kamaran for healthy ships.

The pilgrims will be disembarked: they will wash or take a sea-bath: their soiled linen, the portion of their personal effects and baggage, open in the opinion of the sanitary authority, to the suspicion of contamination, will be disinfected; the duration of those operations, including the disembarkation and embarkation, should not exceed 72 hours.

If plague is reported to exist in the Hedjaz, or to have existed during the pilgrimage, vessels will be subjected, at Jebel-Tor, to the rules prescribed at Kamaran for infected ships.

The plague patients will be disembarked, and isolated in the hospital. Their personal effects will be thoroughly carried out.

The other passengers will be disembarked, and isolated by groups, as if the plague breaks out in one group, the others will not be affected.

The soiled linen, personal effects, and clothes of the crew and passengers, and the ship, will be disinfected.

The local sanitary authority will declare if the discharge of the heavy baggage and cargo is necessary, and if the whole ship must be disinfected, or a portion only.

All the pilgrims will be kept under observation for 12 full days, counting from the day on which the operation of disinfection was completed. If a case of plague occurs in any of the groups, the period of 12 days commences for that group, from the day on which the last case in the group is reported.

Art. 5.—Ships coming from an infected port of the Hedjaz, or from any other port on the Arabian Red Sea coast without having embarked pilgrims or any similar collection of persons and without having had any suspicious cases during the voyage, are placed in the category of ordinary suspected ships. They will be subjected to the preventive measures and treatment laid down for such ships.

If they are bound for Egypt, they will be kept under observation, at Moses Wells, for 10 days, counting from the date of departure, and will, in addition, be subjected to all the measures laid down for suspected ships (disinfection, etc.), and will only be given *free pratique* after a favourable medical inspection.

If it is reported that if these ships have had any suspicious cases during the voyage they will be placed under 12 days' observation at Moses Wells.

Art. 6.—Caravans of Egyptian pilgrims must, before entering Egypt, undergo rigorous quarantine at El-Tor for 12 days; they will then be sent to Ras Mallap, and there kept under observation for 5 days, after which they will only be granted *free pratique* after a favourable medical inspection, and disinfection of their effects.

Caravans of foreign pilgrims will, before returning home by land, be subjected to the same measures as Egyptian caravans, and must be accompanied by sanitary guards to the limits of the desert.

Caravans coming from the Hedjaz by way of Akabah or Moilla will be subjected, on arrival at the Canal, to medical inspection, and disinfection of soiled linen and personal effects.

Art. 7.—(1) The trans-shipment of pilgrims is strictly forbidden in Egyptian ports.

(2) Ships coming from the Hedjaz or from an Arabian Red Sea port with clean Bill of Health, not having on board pilgrims or any similar collection of persons and on which no suspicious cases have occurred during the voyage, will be given *free pratique* at Suez, after favourable medical inspection.

Art. 8.—Ships leaving the Hedjaz with a clean Bill of Health, and having on board pilgrims bound for a port on the African coast of the Red Sea, may call at Suakin, there to undergo 3 days' observation, all passengers being disembarked and detained in the quarantine encampment.

Art. 9.—Caravans of pilgrims arriving by land will be subjected to medical inspection and disinfection at Moses Wells.

Sanitary measures to be taken on the departure for the South of pilgrims from the ports of the Hedjaz.

The ports of embarkation should be provided with sufficient sanitary appliances to enable pilgrims returning to their homes to be subjected to measures similar to those which are enforced on the departure of pilgrims from ports beyond the Straits of Bab-el-Mandeb.

The application of these measures will be optional, that is to say, that they need not be applied unless the consular authority of the country to which the pilgrims belong, or the doctor of the ship on board which they embark, considers it necessary.

B.—MEASURES TO BE TAKEN IN THE PERSIAN GULF.

I.—Sanitary rules for vessels entering the Persian Gulf.

Any ship with plague on board, or on board which one or more cases have occurred within 12 days, will be considered infected.

Any ship on board which there has been a case of plague at the time of departure, or during the voyage, but on which no fresh case has occurred for 12 days, will be considered suspected.

Any ship, even though coming from an infected port, which has had no death, or case of plague on board, either before departure, during the voyage, or on arrival, will be considered as healthy.

Infected ships will be subject to the following rules:—

(1) The sick will be immediately disembarked and isolated.

(2) The other persons on board should also, if possible, be disembarked and kept under observation, for a period varying according to the sanitary condition of the ship, and the date of the last case, but which must not exceed 10 days.

(3) The soiled linen and personal effects of the crew and passengers, which, in the opinion of the sanitary authority of the port, should be considered as infected, will be disinfected, as also the ship, or the contaminated part of the ship.

A more thorough disinfection may be ordered by the local sanitary authorities.

Suspected ships will be subjected to the following measures:—

1. Medical inspection.

2. The soiled linen and personal effects of the crew and passengers, which, in the opinion of the local sanitary authority, may be regarded as contaminated, should be disinfected.

3. Disinfection of all parts of the ship which have been inhabited by patients or suspicious cases. A more thorough disinfection may be ordered by the local sanitary authority.

4. Pumping out the bilge water, after disinfection, and the substitution of good drinking-water for the water stored on board.

5. The crew and passengers should be kept under observation for a period of 10 days, commencing from the date of the last case on board.

Healthy ships will be given *free pratique* at once, irrespective of the nature of the Bill of Health.

Such ships must, however, in all cases, have completed, must complete, 10 full days from the date of departure from the last infected port at which they have touched.

The only measures the authority of the port of arrival may apply to healthy ships are those prescribed for suspected ships.

(medical inspection, disinfection, pumping out the bilge water and the substitution of good drinking-water for the water stored on board).

It is to be understood that the appointed authority of the port of arrival may always demand a declaration on oath from the doctor, or failing him, from the captain, that there has been no case of plague on the ship since her departure.

In deciding on the extent to which effect is to be given to the measures prescribed above, the authorities of the port should take into consideration the fact that there is a doctor, or a disinfecting apparatus (stove) on board the ships coming under three headings mentioned above.

Special measures may be prescribed for ships in an insalubrious condition.

Goods arriving by sea should be treated in the same way as goods transported by land, as regards disinfection, prohibition of import, transit and quarantine.

Any ship objecting to submit to the obligations imposed by the authority of the port is free to put back to sea.

The disembarkation of goods may be authorised, after the following necessary precautions:—

1. Isolation of the ship, crew, and passengers.
2. Pumping out the bilge water after disinfection.
3. Substitution of good drinking-water for the water stored on board.

The disembarkation of passengers wishing to land may also be authorised, on condition that they submit to the measures prescribed by the local authorities.

II.—Sanitary posts in the Persian Gulf.

There are two places in the Persian Gulf suitable for the establishment of sanitary posts—one in the Straits of Ormuz (the Island of Ormuz, the Island of Kishm, or, failing these, a place to be settled in their vicinity); the other at a place to be settled in the neighbourhood of Bassorah.

The sanitary post in the Straits of Ormuz should be provided with at least two doctors, sanitary officers and guards and appliances for disinfection. A small hospital should also be constructed.

A big lazaretto and apparatus for disinfecting goods should be constructed at the post near Bassorah with a medical staff of several doctors.

Before entering the Persian Gulf, ships must touch at the sanitary post in the Straits of Ormuz. They will there be subjected to the sanitary measures prescribed by the rules. If there are any plague cases on board, the sick will be disembarked.

Ships wishing to proceed at once up the Shat-el-Arab will be permitted, if the period of observation is not completed, to continue their voyage, through the Persian Gulf and the Shat-el-Arab in quarantine. A sanitary officer and two sanitary guards, taken on board at Ormuz, will keep a watch on the ship as far as Bassorah, where a second medical inspection will be made, and the necessary disinfection will be carried out.

Ships wishing to disembark passengers or goods at Persian ports will be permitted to do so at Bushire, when suitable sanitary arrangements have been made; until then, they must land their passengers and goods at Ormuz or Bassorah.

It is to be understood that a healthy ship will be granted *free pratique* at the ports of the Persian Gulf ten days after the date of departure from the last infected ports at which she has touched, provided that she is shown to be healthy on arrival.

The sanitary posts at Ormuz and Bassorah will be under the control of the Constantinople Board of Health. The Ottoman and Persian Governments will come to an agreement with regard to the post at Ormuz.

Until the Ottoman and Persian Governments have arrived at this agreement, a sanitary post will be established as a temporary measure in one of the islands in the Straits of Ormuz, and the Board of Health will post doctors and sanitary guards at this place. These guards will accompany ships passing in quarantine up the Shat-el-Arab to the post established in the neighbourhood of Bassorah.

The Constantinople Board of Health will also organise without delay sanitary posts at Khanikin, and Kizil Dize, near Bayazid, on the Perso-Turkish and Russo-Turkish frontiers.

CHAPTER II.

MEASURES TO BE TAKEN IN EUROPE.

Section 1.—Measures to be taken to keep the Governments which are parties to the convention acquainted with the existence of an epidemic of plague, and with the means taken to prevent its spread and its importation into healthy countries.

Notification and subsequent communications.

The Government of an infected country must notify to the other Governments the existence of all cases of plague. This measure is essential.

It will only be of real use, if the Government of the infected country is itself informed of cases of plague and suspicious cases occurring in its territory. It cannot, therefore, be too strongly impressed on the different Governments that doctors should be obliged to report all cases of plague.

The notification should state the existence of cases of plague, the places where they have occurred, the date of their appearance, the number of cases reported, and the number of deaths.

The notification should be made to the diplomatic or Consular agents in the capital of the infected country. In the case of countries not represented there, the notification should be made, by telegram, direct to the foreign Governments.

This first notification should be followed by subsequent regular communications, with a view to keep the Governments informed of the course of the epidemic. These communications should be made at least once a week.

The reports concerning the outbreak and course of the disease should be as complete as possible. They should, in particular, state the measure taken to check the spread of the epidemic and should give, in detail, the preventive measures adopted, with regard to—

- sanitary or medical inspection;
- isolation;
- disinfection;

and the measures prescribed with regard to the departure of ships, and the export of susceptible articles.

It is to be understood that neighbouring countries reserve to themselves the right to make special arrangements, with the object of organising an exchange of direct information between the principal administrative officers on their frontiers.

The Government of each country must publish, immediately, the measures which it decides to adopt with regard to arrivals from an infected country or local area.

The information must be at once communicated to the diplomatic or Consular agent of the country affected, resident in the capital. In the absence, in the capital, of diplomatic or Consular agency the communication should be made direct to the Government interested.

The withdrawal of the measures, or any modifications which may be made in them, must be communicated in the same manner.

SECTION II.—Conditions under which a local* area is to be considered infected or healthy.

Any area in which a case of plague has been officially reported to exist will be considered to be infected.

Any area in which plague has existed will cease to be considered as infected, when it is officially reported that no death or fresh case of plague has taken place for ten days after the recovery or death of the last case, provided that the necessary disinfection has been carried out.

Preventive measures will be taken in the infected territory as soon as cases of plague are officially reported.

These measures will be discontinued as soon as it is officially stated that the area has again become healthy.

It will not be necessary to apply these measures on the occurrence of a few imported cases if there is no diffusion of the malady.

SECTION III.—Necessity of restricting to the infected local areas the measures taken to prevent the spread of the epidemic.

The precautionary measures should be confined to the infected tract, and the Governments concerned should only apply them to persons and goods from infected areas.

But the obligation to restrict precautions to the infected area exists only on the express condition that the Government of the infected country takes the necessary measures to prevent the exportation of susceptible articles derived from the infected area.

No restrictive measure should be enforced against persons and goods from an infected area, if they left it at least 5 days before the occurrence of the first case of plague.

SECTION IV.—Goods and articles which may be considered "susceptible" with reference to the rules regarding the prohibition of import and transit, and the rules regarding disinfection.

I.—Import and transit.

The following is a list of the susceptible articles and goods, the importation of which may be prohibited:—

1. Used linen, clothing, personal effects and bedding.
- When these articles are carried as baggage, or in consequence of a change of abode (household goods), they are subjected to special treatment.

* A local area means a portion of the territory of a country placed under a recognized administrative authority; as, for instance, a province, a local Government, a district, a department, a canton, an island, a commune, a town, a village, a harbour, an area reclaimed from the sea, etc. whatever may be the extent and population of the portion of territory."

Soldiers' and sailors' kits, returned to their country, after their death, should be treated in the same way as the articles named above.

2. Rags, not excepting rags compressed by hydraulic force, which are carried as merchandise in bales.

3. Old sacking, carpets and old embroidery.

4. Raw hides, untanned and fresh skins.

5. Animals refuse, claws, hoofs, horse hair, hair of animals generally, raw silk and wool.

6. Human hair.

The transit of susceptible goods or articles packed in such a way that they cannot be handled on the way should not be forbidden.

Similarly, when merchandise or susceptible articles are transported in such a manner that they cannot have come into contact with infected objects during the journey, their transit through an infected local area should not bar their importation into the country to which they are consigned.

The rules regarding the prohibition of the import of susceptible goods and articles will not be applied in cases where it is proved to the satisfaction of the appointed authority of the country to which they are consigned that they were despatched at least 5 days before the occurrence of the first case of plague.

Merchandise must not be kept in quarantine on land frontiers.

Absolute prohibition or disinfection are the only measures which may be taken.

II.—Disinfection.

Baggage.—Disinfection will be compulsory in the case of soiled linen, wearing apparel, clothes and articles carried as personal baggage, or household goods coming from a local area, declared *infected*, and which the local sanitary authority considers to be contaminated.

Merchandise.—Disinfection will only be enforced in the case of merchandise and articles which the local sanitary authority considers contaminated, or whose importation may be prohibited.

It rests with the authorities of the country to which the articles are consigned to settle the manner by which, and place in which, disinfection should be carried out.

The disinfection should be carried out so as to injure the articles as little as possible.

Each country will settle the question of the compensation to be paid for damages resulting from disinfection.

Letters and correspondence, printed matter, books, newspapers, business documents (not including parcels received through the post) should be subject to no restriction or disinfection.

SECTION V.—Measures to be taken on land frontiers Railway traffic.

Travellers.

Passenger carriages and mail and luggage vans should not be detained on the frontiers.

If a carriage is infected, it should be detached from the train to be disinfected, either at the frontier, or at the nearest stopping place, if this can be arranged.

Goods vans should be treated in the same way.

Land quarantine will no longer be enforced. Only persons presenting symptoms of plague should be detained.

This principle does not affect the right of each country to close, if necessary, any part of its frontiers.

The railway staff should keep a watch on the travellers' health.

Medical intervention will be confined to an inspection of the travellers and the care of the sick.

Where there is a medical inspection, it will be combined, as far as is practicable, with the custom-house inspection, so as to detain the passengers as short a time as possible. On the arrival of travellers from an *infected* area at their destination, it will be found very desirable to keep them under supervision for 10 days, counting from the date of departure.

The measures to be taken in regard to the crossing of the frontiers by the railway and the Post Office staff should be settled by the Administrations concerned. They should be arranged so as not to interrupt the regular service.

Governments reserve to themselves the right to take special measures with regard to certain classes of people, especially—

A.—Gipsies and vagabonds.

B.—Emigrants and persons travelling or crossing the frontier in large bodies.

SECTION VI.—Special Rate for Frontier Tracts.

The regulation of the frontier traffic, and of the questions involved in this traffic, as well as the adoption of exceptional measures of supervision, must be left to special arrangement between neighbouring countries.

SECTION VII.—Water-ways, rivers, canals, and lakes.

The task of regulating by special arrangements, the sanitary rules for water-ways, must be left to the Governments of the countries bordering such water-ways.

SECTION VIII.—Ocean traffic measures to be taken at Ports.

Any ship with plague on board, or on board which one or more cases have taken place within 12 days, will be considered *infected*.

Any ship on board which there has been a case of plague at the time of departure, or during the voyage, but on which no fresh case has occurred for 12 days, will be considered as *suspected*.

Any ship, even though coming from an infected port, which has had no death, or case of plague on board, either before departure, during the voyage, or on arrival, will be considered as *healthy*.

Infected ships are subject to the following rules:—

1. The sick will be immediately disembarked and isolated.

2. The other persons on board should also, if possible, be disembarked and kept under observation or surveillance for a period varying according to the sanitary condition of the ship, and the date of the last case, but which must not exceed 10 days.

3. The soiled linen and personal effects of the crew and passengers, which, in the opinion of the sanitary authority of the port, may be considered as *infected*, will be disinfected.

4. The bilge water will be pumped out after disinfection, and good drinking-water will be substituted for the water stored on board.

5. All parts of the ship which have been inhabited by plague patients should be disinfected. More thorough disinfection may be ordered by the local sanitary authority.

Suspected ships are subject to the following measures:—

1. Medical inspection.

2. Disinfection; the soiled linen and personal effects of the crew and passengers, which in the opinion of the local sanitary authority, may be regarded as contaminated, should be disinfected.

3. Pumping out the bilge water after disinfection, and the substitution of good drinking-water for the water stored on board.

4. Disinfection of all parts of the ship which have been inhabited by plague patients. More thorough disinfection may be ordered by the local sanitary authority.

It is recommended that a watch should be kept over the health of the crew and passengers for 10 days from the date of arrival of the ship.

It is also recommended that the crew should not be allowed to land, except on duty.

Healthy ships will be given *free pratique* at once, irrespective of the nature of the Bill of Health.

The only measures which the authorities of the port of arrival may enforce with regard to such ships consist in those which are prescribed in the case of *suspected* ships (medical inspection, disinfection, pumping out the bilge water, and the substitution of good drinking-water for the water stored on board), except that the measures prescribed for the disinfection of the ship itself may not be enforced in the case of *healthy* ships.

It is recommended that the crew and passengers should be kept under medical supervision for 10 days from the date on which the ship left an infected port.

It is also recommended that the crew should not be allowed to land, except on duty.

It is to be understood that the appointed authority of the port of arrival may always demand a declaration, on oath, from the doctor of the ship, or failing him, from the captain, that there has been no case of plague on the ship since her departure.

In deciding on the extent to which effect is to be given to the measures prescribed above, the authorities of the port should take into consideration the fact that there is a doctor or a disinfecting apparatus (stove) on board the ships coming under the three headings mentioned above.

Special measures may be prescribed for crowded ships, particularly for emigrant ships, or any other ship which appears to be in an insanitary state.

Goods arriving by sea should be treated in the same way as goods arriving by land, as regards disinfection, prohibition of import, transit, and quarantine.

Any ship objecting to submit to the obligations imposed by the authority of the port will be free to put back to sea.

The disembarkation of goods may be authorized, after the following necessary precautions have been taken:—

1. Isolation of the ship, crew and passengers.

2. Pumping out the bilge water after disinfection.

3. Substitution of good drinking-water for the water stored on board.

The disembarkation of passengers wishing to land, may also be authorized, on condition that they submit to the measures prescribed by the local authorities.

Each country should supply at least one port on each of its seaboard, with the organization and equipment necessary to enable it to receive a ship, whatever its sanitary state.

Coasting vessels will be subject to special rules, to be drawn up conjointly by the countries concerned.

(To be continued.)

Reviews and Notices of Books.

THE SURGICAL DISEASES OF CHILDREN AND THEIR TREATMENT BY MODERN METHODS. By D'ARCY POWER, M.A. M.B. (OXON), F.R.C.S. (ENG.), Surgeon to the Victoria Hospital for Children, Chelsea, &c. With Illustrations. London: H. K. Lewis. Post 8vo., pp. 548. 10s. 6d.

THE present work distinctly fills a gap, as the surgery of childhood is singularly wanting in text-books. The author says in the preface that some excuse is necessary for the fact that the work is written by a single individual and not by that system of collaboration which is now fashionable in medical literature. We quite agree with the author's belief that the loss in detail is more than balanced by the gain in harmony, for conflicting statements are less likely to be made when a book is written by one person.

We will only touch upon a few points to show the special features of the work. The first chapter deals with general surgical considerations, in their relation to the diseases of children, and is full of hints. Child author, as a rule, bear general anaesthetics time, but they soon become collapsed, so that no operation should be unduly prolonged, and he did not remember to have seen a case in which it appeared to be inadvisable to give chloroform.

The use of carbolic solution and of iodoform has been given up by the author for some time past, as they so frequently produce poisonous symptoms. He uses freshly boiled water to flush wounds and sinuses, camphorated naphthol for packing cavities and a solution of one and a half or two volumes per cent. in water of hydrogen peroxide for dressing suppurating tracts. The subject of tuberculosis of bones, joints, &c., is dealt with fully and occupies nearly 100 pages. The treatment of tuberculous disease by "sclerogeny" is fully discussed. With regard to the question as to the best time for operating in cleft-palate the author is definite and says "the operation should be performed when the child is about three years of age; but the hare-lip, if it be present, should be repaired at the ordinary time (fourth month), as its closure appears to exercise some degree of traction upon the two maxillæ and so prevents undue widening of the cleft, if it does not actually tend to close it." The author recommends Matthioui's tonsillotomy, but we always considered it as an unsatisfactory and complicated instrument. We have a doctored perforce for McKenzie's improved tonsil guillotine. The surgical aspects of diphtheria are given the importance they deserve. Litholapaxy is recommended in vesical calculi in children. The labours of Keegan, Freyer and Keith in India and of Walsham in England have shown that excellent results can be attained by litholapaxy. Treatment of burns is quite up to date. Aseptic treatment is strongly insisted upon. Picric acid treatment of burns is also given.

The appendix of references contains close upon 200 distinct references, and shows the amount of labour bestowed upon the work. The index is very full. The book contains 60 illustrations and a semi-diagrammatic coloured plate showing the relationship of the synovial membranes to the epiphyses in the shoulder, elbow, hip, knee and ankle.

The various methods of treatment are stated briefly but very clearly. Only so much pathology has been introduced as is necessary to show why the modern treatment differs from that formerly employed. We congratulate the author upon his thoroughly practical work. The book should be read with profit by any one interested in surgical diseases of children.

NOTES ON MICRO-ORGANISMS PATHOGENIC TO MAN. BY SURGEON-CAPTAIN B. H. F. LEUMANN, I.M.S., M.B., LONDON. D. P. H. COMBRIDGE, &c. &c., Bombay. Longmans, Green & Co., London and New York.

WE welcome the appearance of those notes, emanating as they do from a member of the Indian Medical Service. The booklet is almost the first of its kind which has been written in India, and though the notes are based principally on the lectures delivered at Notley during the winter session of 1893-94 by Professor Wright, yet Dr. Leumann has added considerably to the subject, and with the experience he has gained in Bombay during the plague, he is in a position to write a very useful text-book. We recommend the booklet to students.

Appointments, Leave, &c.

BENGAL.

Surgeon-Lieutenant-Colonel E. Borill, Civil Surgeon of Darjeeling, is appointed to be a Civil Surgeon of the first class, *vice* Brigade-Surgeon-Lieutenant-Colonel C. J. W. Meadows, retired. Under rule 6 of the rules contained in the Revised Plague Notification No. 3, dated the 25th May 1897, the Lieutenant-

Governor is pleased to appoint Surgeon-Captain F. O'Kinealy, Officiating Second Resident Surgeon, Presidency General Hospital, Calcutta, to be an Additional Health Officer of the Port of Calcutta in addition to his own duties.

Surgeon-Captain C. R. M. Green made over charge of the Bankura Jail to Assistant-Surgeon F. J. Daloy on the forenoon of the 24th May 1897.

Surgeon-Lieutenant-Colonel F. R. Swaine made over charge of the Ranchi Jail to Surgeon-Captain F. P. Maynard on the forenoon of the 22nd August 1896.

The services of Surgeon-Captain Jay Gould are replaced at the disposal of the Government of India, Home Department.

In the Notification No. 2950 Med., dated the 28th May 1897, sanctioning certain temporary arrangements for carrying on the civil medical duties at Barrackpore, for "Surgeon-Captain H. A. Bonyman" read "Surgeon-Captain H. A. Barryman."

Surgeon-Lieutenant-Colonel A. E. R. Stephens made over charge of the Purnea Jail to Surgeon-Captain E. Harold Brown on the forenoon of the 24th May 1897.

Military Assistant-Surgeon E. A. Bodell is appointed to do supernumerary duty at the Presidency General Hospital, Calcutta.

Military Assistant-Surgeon P. Victor, attached to the Presidency General Hospital, is appointed to act as Assistant to the Surgeon-Superintendent, Presidency General Hospital, during the absence, on deputation, of Military Assistant-Surgeon J. Crabbe, or until further orders.

Military Assistant-Surgeon W. Sherrington acted as a Military Surgeon to the Presidency General Hospital, on deputation, of Military Assistant-

Surgeon P. Victor.

Surgeon-Captain R. Bird, Resident Medical Officer, Medical College Hospital, is appointed, in addition to his own duties, to act as Professor of Physiology, Medical College Hospital, during the absence, on furlough, of Brigade-Surgeon-Lieutenant-Colonel D. D. Cunningham, or until further orders.

Surgeon-Major J. H. T. Walsh, Civil Surgeon of Rangpur, at present officiating as Civil Surgeon of Midnapore, is confirmed in the latter appointment.

Surgeon-Major F. J. Drury is appointed to be Civil Surgeon of Rangpur, *vice* Surgeon-Major J. H. T. Walsh, transferred, but will continue to act as Civil Surgeon of Chittagong until further orders.

Surgeon-Captain J. F. Evans, Officiating Resident Physician, Medical College Hospital, and Professor of Pathology, Medical College, Calcutta, is confirmed in that appointment.

Under Rule 6 of the Rules contained in the Revised Plague Notification No. 3, dated the 25th May 1897, the Lieutenant-Governor is pleased to appoint Surgeon-Captain Jay Gould to be an additional Health Officer of the Port of Calcutta.

Under Rule 6 of the Rules contained in the Revised Plague Notification No. 3, dated the 25th May 1897, the Lieutenant-Governor is pleased to appoint Dr. C. Banks, Superintendent of Emigration, to be an additional Health Officer of the Port of Calcutta in addition to his own duties.

Surgeon-Captain D. R. Hamilton, Army Medical Staff, is appointed to have charge of the civil medical duties at Dum-Dum in addition to his own duties, during the absence, on leave, of Surgeon Captain E. M. Morphew, or until further orders.

With effect from the forenoon of the 24th April 1897, Surgeon-Captain H. A. Stalkart, Army Medical Staff, is appointed to have medical charge of the civil station of Dinapore in addition to his own duties, *vice* Surgeon-Captain B. K. Basu, transferred.

ASSAM.

The Chief Commissioner approves the appointment of Surgeon-Major R. N. Campbell, Civil Surgeon of Shillong, to be Vice-Chairman of the Shillong Station Committee, in the place of Surgeon-Major E. R. W. C. Carroll.

Surgeon-Captain E. C. Haro, Civil Surgeon, on return from privilege leave, is posted to the Sibsagar district.

INDIA.

The services of Surgeon-Major J. I. Routh, A.M.S., are replaced at the disposal of the Military Department, with effect from the date on which he made over charge of his duties under the Government of Bombay.

The services of Surgeon-Lieutenant H. J. K. Bamfield, I.M.S. (Bengal), are replaced at the disposal of the Military Department, with effect from the 31st May 1897.

Surgeon-Captain J. G. Hulbert, M.B., to the charge of the 9th Gurkha Regiment, *vice* Surgeon-Lieutenant-Colonel A. H. Williams, M.B.

N.-W. PROVINCES AND OUDH.

Surgeon-Captain A. W. Dawson, on plague duty, from Lucknow to Hardwar in the Saharanpur district.

Surgeon-Captain J. F. Kelly, on plague duty, from Hardwar in the Saharanpur district to Lucknow.

The services of the undermentioned officers are replaced at the disposal of the Government of India, Home Department, with

effect from the date on which they make over charge of their present duties:—

Surgeon-Captain C. Dalton, A.M.S.

Surgeon-Captain J. F. M. Kelly, M.B., A.M.S.

Surgeon-Major J. F. Tucky, Civil Surgeon, from Saharanpur to Agra.

Surgeon-Captain H. W. Elphick, Civil Surgeon, from Muzaffarnagar to Saharanpur.

Surgeon-Captain H. W. Elphick, Civil Surgeon, Saharanpur, to hold visiting medical charge of Muzaffarnagar until further orders.

Surgeon-Major C. P. Lukis, Civil Surgeon, Agra, privilege leave for three months, with effect from the 22nd July 1897.

Under Section 6 of the Prisons Act, 1894, the Chief Commissioner is pleased to appoint Surgeon-Major W. L. Price, Civil Surgeon, Seoni, to the executive and medical charge of the Seoni Jail.

Surgeon-Major Price assumed charge of his duties from Surgeon-Captain A. G. Hendley on the forenoon of the 5th instant.

CENTRAL PROVINCES.

With reference to Order No. 5049, June, Surgeon-Captain A. G. Hendley and Surgeon-Major W. L. Price respectively made over and assumed charge of the office of Civil Surgeon, Seoni, on the forenoon of the 5th July.

With reference to Order No. 5049, dated the 9th July, Surgeon-Major W. L. Price made over executive charge of the Hoshangabad Jail to Mr. C. A. P. Rogers, I.C.S., Assistant Commissioner, on the afternoon of the 23rd July.

With reference to Order No. 5049, dated the 9th July, Surgeon-Major W. L. Price made over charge of the office of Civil Surgeon, Hoshangabad, to Surgeon-Captain H. St. J. Fraser, on the afternoon of the 23rd July.

The Commander-in-Chief in India is pleased to sanction an exchange of places on the roster of Indian service between the undermentioned officers of the Army Medical Staff:—

Surgeon-Major M. D. O'Connell

and

Surgeon-Major A. E. C. Spence.

Surgeon-Captain W. T. Swau

and

Surgeon-Captain H. G. Hathaway.

BOMBAY.

Surgeon-Major M. A. T. Collie, M.B., Civil Surgeon, Ratnagiri, and Mr. H. Doughton, respectively, delivered over and received charge of the office of Police Officer in charge of His Highness the ex-King Theobaw on the 17th June 1897, in the forenoon.

The services of Surgeon-Major J. I. Routh, A.M.S., are placed at the disposal of the Government of India in the Home Department, with effect from the 20th May 1897.

The following General Order by the Government of India, Military Department, No. 738, dated 2nd July, is republished:—

Surgeon-Major Charles Monks, Superintendent of Mahabaleshwar, acted as Surgeon to His Excellency the Governor from 12th to 22nd May 1897, both days inclusive, in addition to his own duties.

The services of Surgeon-Captain H. F. Cleveland are replaced at the disposal of the Government of India in the Home Department, with effect from the date on which he returned to military duty.

His Excellency the Governor in Council is pleased to appoint Surgeon-Captain J. Lloyd T. Jones, M.B., on relief by Surgeon-Major A. W. F. Street, D.S.O., to take over the duties in Poona performed at present by Surgeon-Major J. P. Barry, M.A., and Surgeon-Captain W. W. O. Boveridge, A.M.S.

His Excellency the Governor in Council is pleased to make the following appointments:—

Surgeon-Captain W. C. Sprague, M.D., to act as Civil Surgeon, Karwar.

Surgeon-Major J. P. Barry, M.B., on relief, to act as Superintendent, Lunatic Asylum, Colaba, pending further orders.

The services of Brigade-Surgeon-Lieutenant-Colonel G. W. R. Hay, M.D., are placed temporarily at the disposal of the Government of India in the Home Department.

The services of Surgeon-Lieutenant H. J. Walton, I.M.S., are replaced at the disposal of the Government of India in the Home Department, with effect from the 21st June 1897.

Surgeon-Captain L. F. Child, M.B., Second Physician, Sir J. J. Hospital, was appointed to act as First Physician, Sir J. J. Hospital, from 2nd April to 14th June 1897, both days inclusive, in addition to his own duties.

Surgeon-Captain A. Street, M.B., F.R.C.S., Second Surgeon, Sir J. J. Hospital, was appointed to act as Senior Surgeon, Sir J. J. Hospital, from 8th May to 3rd July 1897, both days inclusive, in addition to his own duties.

The services of Surgeon-Lieutenant H. A. Dickson, I.M.B., are replaced at the disposal of the Government of India in the Home Department, with effect from the 23rd June 1897.

Under section 37 of the Code of Criminal Procedure, 1832, the Governor in Council is pleased to empower Surgeon-Captain J. L. T. Jones, M.B., I.M.S., Magistrate of the First Class in the District of Poona, to try in a summary way all the offences mentioned or referred to in section 260 of the same Code.

MEDICAL.

The services of Surgeon-Captain Jay Gould, M.B., B.S., I.M.S. (Bengal), are replaced at the disposal of the Military Department, with effect from the 15th July 1897.

The services of Surgeon-Captain H. F. Cleveland, I.M.S. (Bombay), are replaced at the disposal of the Military Department, with effect from the date on which he made over charge of his duties, under the Government of Bombay.

The services of the undermentioned officers are replaced at the disposal of the Military Department, with effect from the dates noted against their names:

Surgeon-Captain B. G. Seton, I.M.S. (Bengal),—20th June 1897.

Surgeon-Lieutenant S. P. James, I.M.S. (Madras),—20th June 1897.

Surgeon-Lieutenant P. Dee, I.M.S. (Madras),—21st June 1897.

INDIAN MEDICAL SERVICE.

Surgeon-Major to be Surgeon-Lieutenant-Colonel.—Jeremiah Mullano, M.D., Bengal Establishment. Dated the 31st March 1897.

Surgeon-Captain to be Surgeon-Major.—Edward Richard William Charles Carroll, Bengal Establishment. Dated the 1st April 1897.

Acknowledgments.

JOURNALS RECEIVED.

British Medical Journal—The Practitioner—Edinburgh
Journal of Obstetrics—Dublin
Journal of Medicine—Gynecology and Obstetrics—Manual of
The Journal of the American Medical Association
Medical Record, New York
Surgical Journal—Times and Register,
Sanitary Reports, United States—Occasional
Bulletin of Advanced Medicine
Surgical Reporter—The American
Journal of the Medical Sciences—Medical Chronicle—Times and
Register—Sanitary Record—Medical Press and Circular—La Tribune
Medicale—La Reforma Medica—Gazette Hebdomadaire—South
Russian Medical Gazette—Gazette Clinique de Bordeaux
Gesundheitsrat—Montreal

BOOKS AND PAMPHLETS RECEIVED.

Bazar Medicines of India. By Edward John Waring, C.I.E., M.D.
Exercises in Practical Physiology. By Augustus D. Waller, M.D., F.R.S.
Disorders of Digestion in Infancy and Childhood. By W. Soltan Fenwick, M.D., B.S., London.
Official Year Book of the Learned and Scientific Societies of Great Britain.

COMMUNICATIONS RECEIVED.

Asst.-Surgn. Subba Row, C.M.S., Kurnool.—Surgn. Capt. T. E. Dyson, Bulsar.—Surgn. Capt. R. H. Elliot, Madras.—Arthur Powell, B.A., M.C.H., Cachar.—Surgn. Capt. J. O. Vaughan, Purulia.—Surgn.-Major G. H. Fink, Garo Hills.—Surgn.-Lieut.-Col. Joubert, Calcutta.—Mildred Staley, M.D., Delhi.—Surgn.-Lieut.-Col. Esmonde White, Travandrum.—Surgn.-Lieut.-Col. Keegan, London.—Kenneth McLeod, M.D., L.D., London.—Surgn.-Capt. D. M. Moir, Calcutta.—Dr. Kedar Nath Das, Calcutta.

Original Communications.

THE MORTALITY OF OPERATIONS IN THE MEDICAL COLLEGE HOSPITAL, CALCUTTA.

By KENNETH MCLEOD, M.D., F.R.C.S.E., LL.D.

It has come to my knowledge that on more than one occasion figures have been quoted from a book,* which I published in the year 1885, as representing the mortality of operations performed in my wards during my incumbency as First Surgeon in the Calcutta Medical College Hospital. These figures appertaining to the five years 1879—83 have been quoted apparently in ignorance of the fact that I subsequently published in the *Indian Medical Gazette*† details of my surgical practice during the five years 1886—90 on the same plan as the first series. These latter results have never been summarised and I have thought it advisable to present the two series separately and combined in order that

* Operative Surgery in the Calcutta Medical College Hospital. By Kenneth McLeod, A.M., M.D., F.R.C.S.E. London: J. & A. Churchill.

† Vol. XXII, pp. 97, 133, 165, 194, 234, 263; Vol. XXIII, pp. 134, 166, 195, 235; Vol. XXIV, pp. 65, 97; Vol. XXV pp. 97, 129, 166, 196, 260; Vol. XXVI, 161, 193, 225, 257, 289, 321.

Table of 1,848 operations performed in the Medical College Hospital, Calcutta, during the years 1879—83 and 1886—90.

YEARS.	1879—83.			1886—90.			TOTAL.		
	No.	D.	R.	No.	D.	P. C.	No.	D.	P. C.
I. Eye Operations ...	5	0	...	2	0	..	7	0	...
II. Operations on Arteries ...	5	0	...	6	0	..	11	0	...
III. Operations on Veins ...	...	...	...	15	0	..	15	0	...
IV. Operations on Joints { Excisions.	9	2	22.2	17	1	5.9	26	3	11.5
	32	2	6.2	51	0	...	73	2	2.8
TOTAL JOINT OPERATIONS ...	41	4	9.8	68	1	1.5	109	5	4.6
V. Operations on Bones	26	0	...	90	5	5.5	116	5	4.3
IV. Amputations for injury { Primary *	11	3	27.3	21	1	4.8	32	4	12.5
	14	5	35.7	14	4	28.6	28	9	32.1
	22	7	31.8	41	2	4.9	63	9	14.3
TOTAL AMPUTATIONS* ...	61	16	26.2	99	7	7.1	160	23	14.4
VII. Removal of Tumours— (a) Malignant	49	13	26.5	87	9	10.3	136	22	1.62
	140	26	18.6	117	4	3.4	257	30	11.7
	65	9	13.8	129	4	3.1	194	13	6.7
TOTAL TUMOURS ...	254	48	18.9	333	17	5.1	587	65	11.1

* Excluding fingers and toes.

† Including fingers and toes.

the surgical events of these two periods, constituting a record of ten years' experience, should be available for comparison with future data in Calcutta and elsewhere.

The table represents all the "major" operations performed in the First Surgeon's wards during these years. The great majority of them were done by myself, a certain number were performed by members of the hospital staff or by my *locum tenens* during absence on leave. The subjects of operation and circumstances of lodgment were the same in both periods and no principle of selection was applied in either time, the only considerations guiding the question of operating being the good of the patient and the balance of advantage as between operating and refraining. The later series presents a most marked improvement on the earlier. This may, to some slight extent, be attributable to the teachings of experience and to improvements in methods, but the reduced mortality is undoubtedly due mainly to a more enlightened and sedulous application of the antiseptic system.

As I have already published these figures and the cases which they represent in considerable detail, it is not necessary or consistent with the purpose of this communication to add any further remarks.

Table of 1,848 operations performed in the Medical College Hospital, Calcutta, during the years 1879—83 and 1886—99.

YEARS.	1878—83.			1886—99.			TOTAL.		
	No.	D.	R.	No.	D.	P. C.	No.	D.	P. C.
VIII. Removal of foreign bodies ...	7	0	...	4	0	...	11	0	...
IX. Removal of Calculi—									
(a) Urethral ...	3	0	...	3	0	...	6	0	...
(b) Vesical { (i) By cutting ...	19	3	15.8	12	0	...	31	3	9.7
(b) Vesical { (ii) By crushing ...	8	1	12.5	25	3	12.0	33	4	12.1
TOTAL CALCULI ...	30	4	13.3	40	3	7.5	70	7	10.0
X. Incisions—									
(a) Tracheotomy ...	17	7	41.2	13	5	38.5	30	12	40.0
(b) Herniotomy ...	18	9	50.0	29	13	44.8	47	22	46.8
(c) For radical cure of hernia ...	46	3	6.5	61	7	11.5	107	10	9.4
(d) Laparotomy ...	1	1	100.0	5	4	80.0	6	5	83.3
(e) Urethrotomy ...	29	5	17.2	70	16	22.8	99	21	21.2
(f) Others ...	178	17	9.6	151	7	4.6	329	24	7.3
Total Incisions ...	289	42	14.5	329	52	15.8	618	94	15.2
XI. Reparative Operations ...	61	3	4.9	36	0	...	97	3	3.1
XII. Operations not classed ...	21	1	4.8	26	0	...	47	1	2.1
GRAND TOTAL ...	890	118	14.7	1,048	85	8.1	1848	204	11.0

ABDOMINAL SURGERY AT THE EDEN HOSPITAL, CALCUTTA, DURING THE YEARS 1894, 1895 AND 1896.

By BRIGADE-SURGN.-LIEUT.-COL. C. H. JOUBERT, M. B.
(LOND.) F.R.C.S.,

Obstetric Surgeon, Medical College, Calcutta.

(Concluded from page 291.)

AMONG the nineteen other operations involving abdominal section were several of great interest:—

Nos. 1, 3 and 4 were connected with labour.

Case No. 1 was a woman, multipara, who was admitted into hospital at 11 P.M. on the 18th December 1894, having been three days in labour, but in fair condition. There was a hand and arm presenting in the vagina and several feet of small intestine, torn away from its mesentery, protruding through the vulva.

I was sent for and opened the abdomen at 1 A.M., two hours after admission. The abdomen was full of blood and clots; but the foetus was still in the uterus. An incision was made into the uterus, and a foul smelling full-sized foetus extracted. One arm had been torn off at the shoulder. The placenta was detached and free, and the fluid contents of the uterus very foul. The prolapsed intestine was then pulled back into the abdomen through the rupture, which was transverse and posterior at the level of Bandl's ring. The mesentery, from

which the intestine had been torn, stood up like a cock's comb. A serrenceud wire and transfixing pins were then applied to the uterus below the rupture and the uterus and appendages removed. The small intestine was then clamped with safety pins, each passed through a bit of sponge, two inches above and below the points where the tear in the mesentery ended. A number of round worms had to be squeezed previously into the portion of intestine about to be removed which also contained a number more. All the gut, 52 inches, torn away from the mesentery, was then cut away.

The cut ends of intestine were then united by the method invented by Maunsell of Dunedin, New Zealand. This method is an extremely good one and gives a very perfect join. As it requires no special apparatus in the shape of Murphy's buttons, or decalcified bone tubes, it is most suited to an emergent operation like the present one. It gives very perfect union and is easy of performance. The torn mesentery, from which there was no bleeding, was not disturbed. The abdomen was closed in the way usual after hysterectomy after being thoroughly flushed with hot water. The patient's condition after this prolonged operation was fair, but she gradually sank, and died next morning at 11 A.M.

Case No. 3 was a multipara seen in consultation in the native town on the 19th September. She

had been in labour since the 16th and on the 18th, after several doses of ergot had been given, craniotomy had been performed by the doctors in attendance, but delivery had not been effected. Early on the 19th I found her very septic, the uterus firmly contracted at the retraction ring, the cervix much damaged, and that it was impossible to make out what was cervix and what remains of the child's scalp. A Caesarian section appearing to offer the most hope of effectual help in the damaged and septic condition existing, the woman was removed to hospital, and I there performed an ordinary Caesarian section at 2 P.M. The stench from the foetus removed was the most sickening I have ever experienced. Little or no blood was lost during the operation, and the wound in the uterus was closed by a double row of continuous fine silk sutures.

The patient rallied well, and the uterus was washed out twice daily with 1-40 carbolic lotion, but remained very septic. No peritonitis followed, but the patient appeared to have been too profoundly poisoned by sepsis, and got gradually weaker, dying on the fourth day after the operation.

Case No. 4. was that of a woman who had had four living children, the last eight years previously. She gave a history of some months of fever and general pains followed by lameness, some months or a year previously, since which she had been unable to walk without a stick. She was admitted in labour at midnight on 22nd December 1896 at full term. Marked pelvic contraction was detected by the nurse in charge, but for some unknown reason the Resident Surgeon was not informed till 3 A.M. He found the child alive, head low down at outlet, which was greatly contracted; descending rami of pubes close together, tubera ischi $1\frac{1}{4}$ " apart and the same distance from coccyx. Opium was given to stop the uterine contractions pending my arrival, which was only at 5 A.M., owing to delay on the part of the messenger. I found the foetal heart sounds still audible and decided on a Porro's operation. When the patient was put on the table, the shape of the abdomen was found altered, there being now a bulging mass in the right iliac fossa and a depression at the fundus uteri. The abdomen was rapidly opened and a large hæmatoma exposed in the right iliac fossa beneath the peritoneum, evidently from a quite recent rupture of the uterus, which was round but contracted. A rapid incision was made into the uterus, exposing a partially detached placenta, and the child extracted by the feet. All attempts to make the child breathe failed. It had partly escaped from the uterus through a large vertical rent extending from the cervix half way to fundus in the right side. The rupture being vertical and peritoneum intact, the serrenceud wire brought the torn muscular edges well together, and the uterus was cut away at the level of Bandl's ring. There was

no free blood in the abdominal cavity, as, though the rupture was extensive it had not involved the peritoneal coat. The stump was secured and the wound closed in the usual way.

The patient made an excellent recovery; the serrenceud was removed on the 4th day, and the stump with transfixing pin came away on the 7th day, the temperature never going above 100° . The measurements taken afterwards were—between Ant. Sup. Spins = $6\frac{1}{4}$ "—between crests = $7\frac{3}{4}$ "—external conjugate = $6\frac{1}{2}$ ". The inclined conjugate could not be taken on account of the condition of pubic rami, and the promontory being out of reach.

But for the unfortunate delays on the part of the nurse and the messenger it is probable that a live child would have been extracted, as the uterus only ruptured, detaching the placenta, after I reached the hospital, when the child was still alive.

Case No. 2 was one of tubal pregnancy, which ruptured after admission, and was successfully operated upon. The woman, a multipara, was sent in on 15th June 1895 from the out-patient department for abdominal pain due to tubal disease. She had not menstruated for two months, and had had abdominal pain for four or five days. She had been in hospital for a similar pain three years previously. The uterus was anteverted and movable; sound not passed. Curling round the back of uterus was the left tube, somewhat thickened and in Douglas' pouch a tender ovoid body elastic and the size of a small plum, apparently the ovary. There was a bright blood discharge, apparently menstrual, from the 17th to the 22nd. On the 24th the temperature rose to 101° S. On the 25th there was severe abdominal pain with fever. On the 26th the fever continued and the uterus was found to be fixed by some effusion in the left cul. The effusion seemed greater on the 27th and on the 28th there was a prominent swelling in the left lower abdomen reaching nearly to the umbilicus. Vaginal examination gave no information, but the anæmic appearance of the patient made me suspect a ruptured tubal pregnancy. Being very low the patient was fed up with Brand's essence and brandy and the abdomen was opened on 29th June. The lower abdomen and pelvis were found full of blood and clots forming a solid mass. The uterus having been defined the hand was thrust into the blood mass, a dilated left tube detected and pressure forceps applied to the tube near the uterus. The tube and ovary were then brought up out of the wound and a ligature applied. The ligature cut through the tube, and a second one of finer silk had to be applied to the severed proximal end of the tube. The dilated tube and ovary were then cut away. The abdomen was thoroughly cleaned and flushed with hot water and the wound closed round a drainage tube and iodoform gauze. As there was but little oozing the tube and gauze were removed after 24 hours.

The structures removed consisted of the left ovary and a convoluted, somewhat thickened tube dilated at the outer end into a sac the size of a pigeon's egg enclosing a large blood clot. The fimbriae at the end of the tube were unchanged and the ostium open. There was no rupture of the tube, the blood having apparently escaped from the open ostium. No ovum was found in the tube and none detected in the clot in the abdomen. The specimen was put into formic acid solution to harden for further examination, but was unfortunately found and carried off by a crow. The case was one of the variety described and named by Bland Sutton as "tubal abortion," the ovum escaping into the abdominal cavity through the open abdominal ostium of the tube.

The patient made a good recovery.

Case No. 5 illustrates well some of the formidable difficulties met with in abdominal surgery. The patient, a multipara of 40, had noticed a tumour for eight months. She was very weak and low with subnormal temperature. Urine normal. The tumour was of irregular shape, reaching from pelvis to ribs, cystic below, hard above. The pelvis was free, the uterus of normal size lying under the base of the tumour. A multilocular ovarian tumour was diagnosed. On opening the abdomen by an incision which had to be increased to 8" the omentum was found very vascular and adherent to the tumour. On separating the omentum a shining white cyst wall was exposed. The relations could not be made out on account of the adhesions. Tapping drew off only 38 oz. of dark brown turbid fluid like that from an inflamed ovarian cyst. The lower adhesions were now broken down to ascertain the pelvic connections. There was free venous bleeding but sponge pressure controlled it. The only pelvic connection was found to be a thin kind of pedicle composed of large veins arising from the vicinity of the left broad ligament. On the right side there was intestine on the lower wall of the cyst and the peritoneum passed smoothly off its whole length on to the right posterior abdominal wall. The top of the tumour was free and lobulated, but across the front there passed a long coil of small intestine, apparently adherent. The hand was now passed into the cyst to break down the secondary cysts, but it only broke down soft friable tissue and passed readily to the top of the tumour. On withdrawing handfuls of this tissue it was found to be of soft friable nature, not merely organised lymph. The abdominal incision was now as above stated increased to 8", and the whole mass brought out after tying adhesions and veins. It then became apparent that the growth was a breaking down solid tumour arising from the retroperitoneal cellular tissue. The mesentery of the ilium was attached to the tumour, passing from the upper right front down to the left, then behind and under the base of the tumour

to join the caecum. At the lower part, the gut was spread out over the base of the tumour, and was only recognisable by its faint muscular fibres. As it was evident that the tumour was sarcomatous and could not be removed, the cut edges of the cyst were stitched to the abdominal wound. The patient, however, was practically moribund, and expired while the wound was being closed.

A *post-mortem* examination showed that the relations of the tumour had been correctly made out during the operation. It was partly solid (above) and partly cystic (below) growing behind the peritoneum from the pancreas to right sacro-iliac synchondrosis. The adhesions were due to inflammation of the cystic portion, and masked the real nature of the tumour. The pelvic organs were matted together by inflammatory lymph. The mass when removed after death weighed 5½ lbs. The solid portion cut like firm brain matter and was pale.

Case No. 9 was one of general peritoneal papillomata and encysted ascites, and was apparently cured by abdominal section. She was a multipara, and had suffered from general dropsy and ascites after chronic malarial fever. The general dropsy had disappeared under treatment, but the ascites had persisted during the eight months previous to admission. The abdomen was greatly distended and dull in front, but the flanks were resonant. Uterus normal and movable. A diagnosis of a large unilocular ovarian cyst was made. The abdomen was first opened by a 1" incision and 400 ozs. of clear serous fluid, full of cholesteroline escaped. The peritoneum was very thick, but no cyst wall could be made out. The finger inserted detected numerous large masses of papillomatous growth, but the intestines appeared to be behind a thick membrane. The pelvic organs were surrounded by papillomata and several thin cords were felt. The incision was enlarged to admit the hand, which, passing upwards, felt the free edge of the liver. The cords were thickened omental vessels unsupported by omental tissue. The intestines all lay behind a thickened adherent omentum. Everywhere masses of papilloma were felt. The wound was then closed. The patient made a good recovery, and though kept for some weeks under observation, no fluid reaccumulated.

Case No. 10 was one of misplaced spleen which led to an error of diagnosis. The patient was English and single, suffering from painful and profuse menstruation, with a tumour in the lower abdomen. On examination I found a central rather irregular hard mass, somewhat movable and reaching from the pelvis nearly to the umbilicus. The uterus was small, sound entering 2½", point passing up and to the left. The mass moved with the cervix and filled the posterior end. It appeared to be a uterine fibroid, and I decided, considering the age, 19 years only, to remove the appendages. On opening

the abdomen and raising the omentum a purple tumour was found filling the posterior $\frac{2}{3}$ rd of the pelvis, and reaching upwards to within 3 fingers breadth of the umbilicus. It was the spleen, the attachment of which reached from the bifurcation of the aorta downwards for 2" along the left common iliac artery. The splenic artery seemed to rise either just above or just below the bifurcation of the aorta. The organ hung over the promontory of the sacrum, most of it being in the true pelvis, pushing the uterus forward. Owing to its low attachment it appeared to be useless to try to push the spleen up into the left flank, but the after history shows that it could have been done. The abdomen was closed after these conditions had been made out, and the patient made a normal convalescence. When seen six months later the spleen had much diminished in size, and could be so far pushed up that the sacral promontory could be felt. The uterus had become retroverted, but nothing else was felt in the pelvis. A month later, when still smaller, the spleen, on being pushed up, rose with a jerk to the normal position, the lower edge being felt two fingers breadth below the ribs.

Case No. 11 was one of cystic right kidney. The patient was admitted into the College Hospital as one of ascites from liver disease, but was transferred to the Eden Hospital as a case of ovarian cystoma. She had noticed a lump in the right lower abdomen five years previously. Her 6th child was born two years ago. About five months before admission she had been tapped at a mofussil dispensary, and 200 ozs. of clear brown fluid drawn off. The tumour had rapidly re-appeared, and on admission the abdomen was filled by a soft fluctuating tumour, the greatest girth being 36". The urine was normal and free from albumen. The pelvis was quite clear, the

uterus small, movable and lying under the tumour, which was felt in the roof of the pelvis hard and non-fluctuating.

On opening the abdomen the tumour was found to be lying behind the ascending mesocolon, which was spread out over it. The colon coursed obliquely upwards and to the left over the lower front of the tumour. The hand passed in found no pelvic connections, the uterus and appendages being felt to be quite normal. The cyst was clearly retro-peritoneal. Tapping removed 208 ozs. of reddish opaque fluid. Complete collapse of the cyst did not occur, the lower part feeling solid. The trocar puncture was enlarged to permit of the cyst being shelled out from behind the peritoneum. The cyst reached the liver above and filled the right posterior half of the abdomen. It shelled out readily and in the process kidney tissue came into view from below. The fingers passed into the cyst found two large irregular calculi and two or three small ones loose in the cyst. The renal vessels and ureter when reached were secured by a Staffordshire knot and the cyst cut away; the cut ends of the vessels and the ureter were separately tied again with strong silk and the cavity stuffed with iodoform gauze. The peritoneal sac (edges of) was stitched to the abdominal wound having a small central opening for the gauze to be removed. The collapsed cyst weighed 1lb, and at its lower part was some healthy looking renal tissue, the rest being thick fibrous tissue. Another large calculus was found in the solid part, projecting into the cut part of the ureter.

The woman made an excellent recovery, the cavity filling up rapidly. A month later the skin of the abdomen lay in loose folds and the mouth of the wound had retracted into a deep pocket. The urine remained normal all through.

Other operations involving abdominal section at the Eden Hospital in 1894-1895 and 1896.

No.	Date.	Condition and number of children.	Length of incision	Nature of disease and duration of illness.	Nature of operation.	Result.	Race.	REMARKS.
1	19th Dec. 1894 ...		8"	Transverse presentation. Rupture of uterus. Prolapse of 52 inches of small intestine. Three days in labour before admission.	Porro's operation. Resection of intestine and enterostomy.	Death after 12 hours.	Bengali	... Presenting a r m had been torn off. Intestine had been separated from mesentery.
2	29th June 1895 ...	M. 4 para ...	4"	Ruptured tubal pregnancy. Two mos. pregnant.	Removal	... Cure ...	Bengali.	
3	19th Sept. 1895 ...	M. 6 para ...	6"	Craniotomy outside hospital. Fetus still. Uterus very septic, os firmly contracted.	Cæsarian section.	Death on 3rd day from septicæmia.	Bengali.	
4	22nd Dec. 1896 ...	M. 4 para all born alive.	6"	Osteomalacia — contracted outlet. Twelve hours in labour.	Porro's operation.	Cure	Bengali.	
5	20th June 1894 ...	M. 5 para ...	8"	Cystic sarcoma behind mesentery of ilium.	Attempted removal.	Death during operation.	Bengali.	

Other operations involving abdominal section at the Eden Hospital in 1894-1895 & 1896.—(Contd.)

No.	Date.	Condition and number of children.	Length of incision.	Nature of disease and duration of illness.	Nature of operation.	Result.	Race.	REMARKS.
6	August 1894	... Child	... 2½"	Intussusception of ilium and purulent peritonitis.	Reduction	... Death after 12 hours.	Bengali.	
7	26th Sept. 1894	... M. 0 para	... 1½"	Peritoneal cancer	... Exploratory tapping.	Death 10 months later.	Eurasian.	
8	24th Oct. 1894	... S.	... 2	Ditto	... Ditto	Death 3 weeks later.	Ditto.	
9	Oct. 1894	... M. 0 para	... 3"	General peritoneal papillomata and encysted ascites.	Exploratory laparotomy.	Cure	... Bengali.	
10	11th Oct. 1894	... S.	... 3"	Enlarged and misplaced spleen (in pelvis.)	Ditto	... Recovery.	English.	
11	6th Feb. 1895	... M. 6 para	... 6"	Cystic kidney, 5 years' history.	Removal	... Cure	... Bengali	... Fluid contents = 208 oz. sac = 1 lb. 5 calculi loose in cyst.
12	9th Sept. 1895	... M. 0 para	... ..	Cancer of body of uterus and fibroid tumour.	Vaginal hysterectomy.	Death from shock.	English	... Uterus weighed 14 oz.
13	15th Jan. 1896	... S.	... 3"	Cæcal tumour, probably tubercular.	Exploratory laparotomy.	Death after 1 month from tuberculosis.	Eurasian.	
14	9th Mar. 1894	... M. 11 para	... ..	Umbilical hernia	... Radical cure	... Cure	... European	... Patient weighed 26 stone.
15	18th Dec. 1895	... ..	4"	Ventral hernia after laparotomy (Madras) 9 mos. previously.	Repair	... Cure	... Austrian.	
16	4th April 1894	... M. 2 para	... 3"	Pelvic peritonitis	... Exploratory incision.	Relieved	German.	
17	17th July 1895	... M. 0 para	... 1½"	Chronic peritonitis	... Ditto	Death 3 months later.	Bengali	... 200 oz. fluid.
18	30th Nov. 1895	... M. 1 para	... 3"	Encysted peritonitis	... Ditto	Cure	... Bengali	... 240 oz. purulent fluid.
19	5th Feb. 1896	... M. 1 para	... 2½"	Ditto	... Ditto	Death 2 months later.	Bengali.	

ABDOMINAL SURGERY AT DARBHANGA IN 1896.

BY SURGN.-CAPT. E. HAROLD BROWN, M.D.,
Purneah.

THE subjoined cases, consisting of ten ovariectomies and two splenectomies, represent the most important operations performed at the Darbhanga Hospitals in 1896. Of the former, seven were operated on by myself, with six recoveries; my Assistant-Surgeon, Babu Nobin Chunder Dutt, being responsible with my assistance, for the remaining three, all of which recovered. The splenectomies, both of which were successful, were performed by me.

Ovariectomies performed at the Dufferin Hospital, Darbhanga, with able assistance of Miss Amy Ramsbottom, the Lady Doctor in charge.

Case 1.—Rambati, Hindu, aged 35; multipara; duration two years; left-sided; girth at umbilicus, 34".

Operation on February 12th: Incision 3" abdominal wall not vascular; cyst contents extremely viscid, eventually blocking the cannula; cyst wall freely incised, care being taken by sponge-packing and inversion of the margins of the wound, to prevent the gelatinous material from passing into the cavity of the

cœlom. The size of the mass not being materially diminished, it was evident we were dealing with a solid growth which was too large to be delivered through the existing wound; this was accordingly extended upwards to the extent of nearly three inches, when, there being no adhesions, the mass was brought outside. The pedicle was thick and fleshy, and was transfixed and tied in halves before being divided.

The abdominal cavity was irrigated with warm boric lotion, and the wound closed with twelve silk-worm gut sutures and dressed with iodoform and boric lint.

The solid mass weighed seven pounds, and the fluid measured twelve pints.

After history.—No vomiting or tympanitis. Dressings removed on the 8th day; wound healed. Highest temperature on the 5th day, 102°. Discharged well on the 18th day.

Case 2.—Rambati, Hindu, aged 38; multipara; duration 2½ years; right sided; circumference, 36"; tapped once at another hospital, a few months previously.

Operation on April 2nd: Incision 3"; abdominal wall very vascular: peritoneum also vascular; adhesions expected. Contents viscid: cyst unilocular; numerous soft adhesions, easily dealt

with, found anteriorly and above, and a very hard, firm one below, attaching the cyst wall to the bladder, which had to be dealt with very carefully, so as to avoid injuring the latter organ. Pedicle, short and thick, tied with the Staffordshire knot. Abdominal cavity not irrigated. Fluid 20 pints.

After history.—No vomiting or abdominal distension; highest temperature 100.6° on evening of 2nd day. Dressings removed on the 8th day; wound healed. Patient discharged on the 20th day.

Case 3.—Sukhini, Hindu, aged 45; multipara; duration one year; left-sided; circumference 37". Admitted with great abdominal pain and tenderness; P.M. temperature 100.6° .

Operation on 8th August: Incision 3"; abdominal wall very vascular; contents of cyst very dark red and fluid; extensive adhesions in all directions, most of them being soft and easily broken down by sponging; but firm and troublesome below, where connected with the bladder, and especially difficult to remove on each side where the cyst wall was adherent to the intestines. To deal effectually with these, the incision had to be prolonged an inch and a half upwards. Pedicle very narrow; tied without transfixion. Abdominal cavity thoroughly irrigated, several small clots being thus washed out, especially from the left iliac fossa, where the adhesions had been very intimate.

Wound closed and dressed as usual. Fluid removed 18 pints.

Subsequent progress of the case. No vomiting or distension. On the second evening the patient complained of soreness of the mouth, with salivation, and I found the mucous membrane swollen and ulcerated in patches. On careful inquiry it was discovered that the lotion employed for irrigation was a one-in-five thousand solution of corrosive sublimate, instead of boracic acid; and this, of course, explained the patient's symptoms. This complication retarded convalescence a good deal; the highest temperature was 102.2 on the tenth evening, and the patient was discharged on the 30th day.

Case 4.—Mangli, Hindu, aged 25, multipara; duration eleven months; left-sided; girth 33".

Incision 3"; abdominal wall fat; no bleeding; contents of cyst pale and viscid; no adhesions; much solid matter; incision enlarged upwards an inch; pedicle broad and thin, transfixed; irrigation not employed; wound closed and dressed as usual.

After history.—No vomiting or distension; highest temperature 100.8° on 6th evening. Dressings removed on 6th day; wound healed. Patient discharged on 19th day.

Case 5.—Kalhari, Hindu, 40; multipara; duration several years; right-sided; circumference 34".

The patient was thin and weak, with a quick feeble pulse and cedema of the feet. The tumour

presented several outlying projections, notably in the left inferior and right superior limits of the growth. At the latter side there was great tenderness, together with a peculiar superficial fremitus, easily elicited and exactly like that of a hydatid cyst.

Operation 26th October: Incision 3"; abdominal wall very vascular; some free ascitic fluid: contents of cyst very viscid and opaque; tumour chiefly solid; incision extended upwards to the extent of three inches, and tumour incised, with the usual precautions, to prevent its contents from passing into the peritoneal cavity. Many outlying cysts, especially at the right upper portion, no adhesions; pedicle, thick and fleshy; transfixed; its cut surface presented several large vessels each of which was picked up and tied separately. Abdominal cavity thoroughly irrigated; wound closed and dressed as usual. Solids 5 pounds; fluid 11 pints.

After history.—No distension or vomiting; highest temperature 100° on evening of 7th day. Dressings removed on 7th day; wound healed. Patient discharged on 19th day.

Case 6.—Razgia, Hindu, 42, multipara; duration two years; left-sided; circumference $35\frac{1}{2}$ ". Had been tapped at another hospital a few days before.

A thin weakly woman, with much abdominal pain and tenderness, and a good deal of general distress.

Operation on November 10th: Abdominal wall vascular; a considerable amount of free ascitic fluid; contents of cyst thick and tenacious refusing to flow through cannula; tumour freely incised, with the usual precautions, much fluid escaping, but a great part of the swelling was solid. Abdominal wound extend both upwards and downwards; general adhesions above, in front, below, and on each side; some soft but very vascular; others hard and firm; a very dense adhesion to the bladder. The huge mass, on being delivered, brought with it several long strands of vascular omentum. Pedicle thick and vascular; transfixed.

There was a good deal of oozing going on in the abdominal cavity after removal of the tumour, and about a dozen more ligatures had to be applied in various directions, after which irrigation was thoroughly carried out, and the wound was closed and dressed in the usual manner. Solid matter $6\frac{1}{2}$ pounds, fluid 22 pints.

The patient was very low and was put to bed surrounded with hot water bottles, a subcutaneous injection of $\frac{1}{16}$ grain of strychnine being administered. The temperature was 97° and the pulse 140. The patient remained in this condition for more than twenty-four hours, the pulse rising by twenty beats on the second day, the temperature being stationary. On the evening of the second day there was slight tympanitis, for which an enema was given, and the next morning the rectal tube was passed

with relief. The temperature was now 98.4° and the pulse 136, the patient being distinctly better, but complaining of a good deal of pain. Sulphate of Magnesia was ordered in two-drachm doses, every second hour, free purgation following the fourth dose, and the patient quickly improving thereafter.

There was no sickness throughout; the highest temperature was 102° on the 7th day; the dressings were removed, and the wound found healed on the 8th day, and the patient was discharged on the 22nd day.

This was a desperate case, and gave me great anxiety. At one time I thought it was impossible for her to recover, as the pulse remained at 160 for twenty four hours and the patient was extremely low.

Keith lays down the following as an axiom:—"When a patient is put back to bed with a pulse of 140 and the heart shows no tendency to quiet down in twenty-four hours, the patient almost invariably dies, apparently from prolonged shock."

In the case under report, I think the favourable result was, to a great extent, produced by the saline purgative administered. This had the effect of preventing peritonitis, the danger-signals of which were already out; and, the moment the bowels were able to expel their gaseous and liquid contents, improvement set in and steadily progressed.

ON THE DIFFERENCE BETWEEN SERUM AND BLOOD SOLUTIONS, THE CONDITION OF THE TEST CULTURE AND THE SIGNIFICANCE OF BACTERIUM COLI INFECTION IN RELATION TO TYPHOID DIAGNOSIS.

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(From the Laboratories of the Board of Health of the Province of Quebec and the Montreal General Hospital.)

WE wish to report some details concerning technique, which we find necessary, in order to insure successful results in serum diagnosis by the dried blood method, with which we have now tested over 500 bloods.

We mention the facts only in so far as they have a direct practical bearing on diagnostic work.

Our results already published were as follows:

1. Out of 129 cases, which we had good reason to regard as true typhoid, if we exclude a few cases where the first samples were taken at a very early stage and no re-examinations could be obtained, and also a few cases first examined late in convalescence, we have met with but one apparently genuine case of severe typhoid, which, when re-examined under satisfactory conditions, did not give a decisive reaction by the dry blood method and this one also gave no reaction by the serum method. Occasionally

the first appearance of the reaction is delayed beyond the end of the first week.

2. We have never met with a well-marked reaction under conditions where there were not strong reasons for believing it to be due to typhoid.

3. In a few cases, where the result of the blood examination remained in doubt, the mild type of the fever made an accurate clinical diagnosis impossible. In such cases, we believe bacteriological examination to be the most exact method of procedure.

4. We have not yet met with a case of typhoid where a decisive reaction was obtainable by the serum method and not by the dried blood method.

5. We found that pseudo-reactions may be avoided by attention to the character of the culture media. We have found that by using an attenuated or quiescent stock culture grown at room temperature, and transplanted at intervals of about one month, a suitable degree of sensitiveness was obtained. From such stock cultures a 24-hour bouillon at 37°C., with a moderately diluted blood solution, or serum would give prompt and decisive reaction within a few minutes in the case of typhoid patients, while concentrated solutions of non-typhoid blood or serum were found to give no reaction, even at the end of 24 or 48 hours, hence estimation of the amount of dilution is not necessary for ordinary diagnostic work. (See circular, Board of Health, Prov. of Quebec, Jan. 7th, 1897.)

The reaction, although specific in degree, is now generally considered to be quantitative, and small amounts of the agglutinative substances are admitted to be present in varying amounts in non-typhoid bloods. The specific substances are, however, a hundredfold more abundant in typhoid blood.

With virulent cultures the presence of agglutinative substances in non-typhoid bloods may lead to pseudo-reactions occurring, which can usually be excluded by estimating quantitatively the intensity of the reaction. These pseudo-reactions we have found to be characterized by a rapid clumping, without the corresponding loss of motion so characteristic of the true reaction. If watched for some hours these clumps tend to break up.

Quantitative estimation is now generally done by diluting the typhoid serum, but may also be done by modifying the virulence of the culture.

The degree of dilution which can be employed with a given blood solution or serum, while still producing a decided reaction, will depend entirely on the activity (virulence) of the culture employed. This factor has been too much left out of the reckoning in much of the work already published, and it probably affords a natural explanation of the widely different results obtained by competent observers.

Cultures which are made active and virulent by frequent (daily) transplantation and growth at body temperature, are much more sensitive to the agglutinative substance than cultures which have become quiescent and attenuated by infrequent (monthly) transplantation and growth at room temperature.

This is apparently at variance with Pfeiffer's statement (*Cent. f. Bakt.*, XIX, p. 594), that highly virulent cultures are less influenced by typhoid and cholera sera than less virulent ones. No details are given by Pfeiffer as to the conditions under which his non-virulent cultures were used. Pfeiffer's statements refer to serum and not to blood solution, he pays little attention to the agglutinative and much to the paralytic phenomena of the reaction, and attaches most importance to certain disintegrative changes produced by his special method of testing *in vivo*. We have stated elsewhere that highly active cultures, if left for a few hours longer than usual between the times of transplantation, rapidly undergo involution changes, and while in this condition, are far more liable to show agglutination than was the case with the same cultures tested a few hours earlier. We have found that for class purposes involution forms in cholera are as abundant and striking in a virulent culture left unchanged for three or four days as would be the case with a non-virulent culture, grown at room temperature, if left without transplanting for as many weeks or months. Bouillon cultures, which have stood long without transplanting, show a tendency to spontaneous partial clumping, which is quite absent during the first 24 hours. For this reason we prefer to use 24-hour bouillons, which are free from sediment, for the test.

The peculiar disintegration obtained by Pfeiffer in typhoid cultures placed directly in the peritoneum of a specially immunized animal, does not tend to occur where the serum is tested *in vitro* by the hanging-drop method. With blood solution, however, this peculiar phenomenon is frequently witnessed. The clumped bacteria, if watched, for an hour or so, may be seen to break up in granules, which gradually become indistinct and vanish whilst under observation until practically no trace remains of the clumps which shortly before studded the entire field of the microscope. The change is more liable to occur in cultures some days old than in young cultures, and more, perhaps, with attenuated than virulent cultures. It does not occur with all samples of typhoid blood, and is not well marked in very dilute blood solutions.

This greater tendency to bacteriolytic action in blood solutions often makes the reactions obtained with them look at first sight less striking and intense than that obtained with serum where the clumps usually remain intact. Apparently, however, the difference indicates that

a large amount of the bactericidal substances originally found in the plasma do not permanently remain as constituents of the serum. This not only has an obvious bearing on serum therapeutics, but explains how the action of serum may be modified by mechanical mixture with the fibrin elements of the blood.

Quantitative estimation of the degree of dilution in the case of blood solutions is possible by hæmometry as well as by making direct measurement. With samples of freshly dried blood, sufficiently accurate observations can be made to express the degree of dilution in multiples of 10—($\frac{1}{10}$, $\frac{1}{20}$, $\frac{1}{50}$, etc.)

We have employed a cell having a depth of 0.85 mm. and giving with a Fleischl's hæmometer a tint reading 100 p.c., with $\frac{1}{10}$ dilution of normal blood. In anæmic cases the dilution will vary with the degree of anæmia, which can readily be determined. Blood dried for some time gradually yields less and less hæmoglobin, owing to the change of this substance into the hæmatin compounds. This change goes on rapidly in air where gas is being burned and slowly in pure air. In any case, the error is in the direction of a less dilution than that shown by the hæmometer. As a matter of experience, we find exact estimation of the dilution, while interesting for scientific purposes is not necessary for the practical purposes of the test if attenuated cultures are used and the establishment of fixed arbitrary time limits, as recommended by Grünbaum seem only of use in avoiding pseudo results, due to the use of highly virulent cultures.

Grünbaum, being enthusiastic for exact estimation of dilution in all cases, claims (*Lancet*, Sept. 19, 1896) that though most sera will in time produce clumping, that typhoid serum can still be specifically identified by its being the only serum, which with free dilution in a ratio of 16 to 1, will produce a complete clumping and arrest motion in 30 minutes. A fixed dilution ratio, with an arbitrary time limit, appears to us quite uncalled for as a routine diagnostic practice, and has no standard value unless a culture of fixed virulence is used.

Since writing the above we find that Grünbaum has now stated on theoretical grounds "that possibly the use of attenuated cultures would enable us to dispense with the dilution" (*Lancet*, Dec. 19, 1896).

We had anticipated *à priori* that the solution obtained from the dried blood would be less sensitive as a reagent than the fresh liquid serum. We find the blood solution on the contrary to be apparently more potent than the serum, in causing the agglutination though not as to the paralytic effect, and perhaps to give the reaction, at a somewhat earlier stage of the disease. This view agrees with the researches of Widal, who found that the agglutinating substance was contained in the globulins and fibrinogen, and

that the serum albumin and corpuscles contained none. Thus the blood serum contains only a part of the agglutinative substance. Dr. A. H. Appel, of the U. S. Army, has also recently made studies and observations showing the greater agglutinative properties of solutions of the whole blood as compared with that of the serum. A decided agglutination can be obtained from weak solutions of the entire blood when none is produced by stronger solutions of the serum. While Widal places the limits of dilution with serum below 1 to 200, R Stern, who employed solutions of the entire blood in bouillon, reports reactions with dilutions of 1 to 2000.*

Owing to the greater sensitiveness of blood solutions as compared with typhoid serum, there is a greater tendency to pseudo-reactions if active virulent cultures are used, than is the case in working with serum. This difficulty is, however, completely obviated by employing attenuated cultures for testing. Cultures which exhibit darting movements in hanging drops are too sensitive for the dry blood test. Those cultures having a quiet but rapid gliding motion in hanging drops have given us uniformly good results. If the movements of the culture become sluggish, one or two daily transplantations at body temperature will make it more active and sensitive. One or two cc. of the living bouillon cultures injected into the peritoneum of a guinea-pig produce immunity and a marked blood reaction without injuriously affecting its health.

Clean preparations containing very little fibrin can readily be obtained if care is taken not to stir up the film of blood-clot and to use plenty of water for dissolving.

We find that the blood dries in a few minutes sufficiently to be enclosed in an ordinary letter.

Our routine method of testing is to place a large drop of water from capillary pipette, on the film of dried blood and let it stand for a minute or two. A loop full of the solution so obtained is taken from the top of the drop and mixed with a loop full of the bouillon culture, or may, if desired, be diluted further.

For the re-examination of cases giving a negative reaction, a somewhat more virulent

culture can be used or a quantitative estimation also made by the serum method. We have not succeeded however in obtaining a decided reaction by the serum when the result with the dried blood was inconclusive and now attach equal importance to a negative result by the dried blood test.

Our published observations (*N. Y. Medical Journal*, Oct. 31, 1896, *British Medical Journal*, Dec. 5, 1896) on the dry blood method were made with attenuated cultures, and pseudo-reactions were practically never encountered.

Later on, for a few weeks, we tried active virulent cultures transplanted daily at 37° c., but these gave us with the dried blood solution numerous and very peculiar pseudo-reactions, i.e., reactions not due to existing typhoid. For instance, the blood of one of us (W. J.) when dissolved gave prompt and abundant agglutination with a virulent culture, while we habitually use it as a suitable negative control blood with attenuated cultures. A solution of the blood of the other (D. D. McT.) gave no reaction. (W. J. had typhoid fever 16 years ago; D. D. McT. has never had it.) W. J.'s blood serum gave no pseudo-reaction with the virulent culture.

On resuming the use of the attenuated cultures described above, the pseudo-reactions disappeared. On re-examining the blood drops which had given them with the virulent cultures, no longer did so when tested with attenuated cultures, although dry blood from genuine cases taken at the same time still reacted typically.

For practical diagnostic work it may be stated that when a blood does not show a decisive reaction in a serious case of fever which has lasted over a week, the fever is almost certainly not typhoid. In very mild febrile cases the result may remain doubtful, unless investigated by an early bacteriological examination of the spleen pulp or stools.

In this connection we may state that we find that Elsner medium containing 25 per cent. of gelatine instead of 10 per cent. will remain solid at a temperature about 30 C., and give visible typhoid colonies within 24 hours.

REACTION WITH THE COLON BACILLUS.

Very little attention has as yet been paid to the clinical significance of serum reactions with colon bacillus. Courmont and Rodet have stated that typhoid blood serum reacts with colon cultures, while Aehard and Chantemesse state that it does not. Widal states that he has studied quantitatively the intensity of reaction of typhoid sera with Coli, but has been unable to draw any important diagnostic conclusions from the results.

Various observers have reported colon reaction as being present occasionally in different chronic and acute diseases. This can readily be understood in the light of our present knowledge of terminal infections. One case which at first strongly

* We observe that Widal, who was the first to show that dried blood could produce the reactions, and already, in June, 1896, obtained reactions from serum after four months' drying, has recently (*Semaine Med.*, Jan. 13, 1897) reported that he has been able to obtain successful results by the dried blood method in the earliest stages of the disease and that the blood after six months' drying retained the power of producing the reaction. The dried blood also gave him positive reactions late in convalescence in cases where agglutination had become very feeble. We are glad to find our published results on these points agree with those of so high an authority. We have found that with those who have had difficulties with the dried method, these have been due to their having acted upon the erroneous idea that the blood solution was much weaker than the serum, whereas, even with attenuated cultures, we have got a reaction readily with it in dilutions as high as 1 to 125.

resembled typhoid but gave no serum reaction, has been recorded by Vidal, who found a marked colon reaction and looked upon it as only colon infection, this opinion being confirmed by the subsequent events. Personally we have found reactions with the colon bacillus to be rare with typhoid blood or serum (even in cases when perforative peritonitis had occurred) provided the typhoid reaction was well marked. On the other hand, we have been struck by the large proportion of positive colon reactions obtained in cases having step-ladder temperature, and other symptoms strongly resembling typhoid, but without the typhoid serum reaction. We think that under these circumstances the colon reaction may have a real diagnostic importance, and indicates that the colon infection, whether occurring alone or as a secondary complication of typhoid, may be playing an important part in the production of the patient's condition. The whole question of associated colon infection deserves further study.

The reaction can be tested with ease by placing a duplicate drop of blood solution or serum on the cover slip with the drop to be tested by typhoid culture and mixing it with a drop of colon bacillus culture. Pseudo-reactions can be avoided by using stock cultures kept at room temperature, and transplanted infrequently. Test cultures grown in bouillon from the stock at room temperature for 24 hours are free from scum or sediment, and give reliable results. The conflicting results just mentioned may have been due to pseudo-reactions having been taken seriously.

In our case of apparently genuine typhoid without serum reaction (on which, by the way the test was first applied during the third week), the blood reacted very decidedly to *B. Coli*, producing typical clumping. The same held good of four other blood samples referred to us for examination as having a clinical course like typhoid, but with negative serum reaction. A complete colon reaction we have found to be exceptional in ordinary typhoid and its presence would indicate a condition of *Coli* intoxication sufficient to explain the existence of many symptoms giving to typhoid its ordinary clinical features. Whether this excludes typhoid, is another question. W. H. Park has observed a case of fever with no typhoid serum reaction, where he was able to cultivate the typhoid bacillus by spleen puncture. Later on in the case, however, a relapse occurred and the reaction appeared. The possibility of a latent typhoid infection overshadowed by toxic phenomena due to concurrent action of the colon bacillus is quite consistent with the generally accepted opinion that many of the symptoms in typhoid and especially the intestinal ones are due to secondary infection by *B. Coli*. It follows that in severe cases of typhoid type, with no typhoid reaction, the blood should be tested with a

culture of *B. Coli* and a bacteriological study made by examination of the stools or by spleen puncture.

In a few cases we have met with a partial typhoid reaction only, in mild cases clinically fibrilar, where the fever subsided by lysis in within two weeks of the onset. Here, the possible presence of typhoid appeared to indicate the prudence of keeping the patients in bed and avoiding articles of diet which are contra-indicated in typhoid. Our experience has been that fibrillae, with completely negative blood reaction, get suddenly well after a few days of fever. Here, also, spleen puncture, as in Dr. W. H. Park's case, might enable a decided diagnosis to be made earlier than by the blood test alone. Westbrook recommends spleen puncture under the circumstances. The possibility of infection by organisms resembling the typhoid bacilli must naturally be borne in mind.

Diabetic blood has been found by Block and by W. H. Park to give a decided agglutination. We have examined two cases of diabetes which both gave perfectly negative results.

CONCLUSIONS.

The difference in reaction observed between typhoid blood solution and blood serum is not simply due to varying intensity, but to an alteration in the relative prominence of the agglutinative, paralytic and disintegrative phenomena which constitute the reaction. The extent of this difference varies with the virulence of the culture, but the difference probably depends also on the presence of part of the specific substances elsewhere than in the blood serum.

Blood solution has a greater capacity than blood serum for producing the disintegrative (bacteriolytic) changes described by Pfeiffer. Descriptions of this phenomena are conspicuously absent from the many recent accounts of the reactions with typhoid serum as observed in hanging drops.

The paralytic effect is relatively more marked with serum than with blood solutions.

Agglutination without stoppage of motion is more readily occasioned in virulent cultures by blood solution than by serum, and does not indicate existing typhoid.

It appears preferable that for the dry-blood method only attenuated cultures should be used. These have the advantage of being more easily kept in readiness than virulent cultures, and are less sensitive to changes of temperature. With the serum method virulent cultures give prompt results. Dried-blood serum can be readily obtained and transmitted to the laboratory by pushing aside the edge of a blood drop which has clotted for a few minutes but has not dried and collecting the serum beneath it on the tip of an ivory vaccine point, etc. This does not, however, give a quantitative result.

For ordinary diagnostic purposes, the simplicity of the method as originally described does not require modification, provided attenuated cultures are used.

A drop of the solution obtained from a dried typhoid blood drop, mixed with a drop of the culture, will give the reaction promptly, without any special attention to the degree of dilution. In order, however, to obtain the best results, it is well to dilute freely, and especially to avoid having a sticky solution of syrup-like consistency.

In cases where the clinical type strongly resembles typhoid and where the serum does not give the typhoid reaction, a decided reaction with cultures of the colon bacillus may explain the symptoms.

Our results with the dried blood test have been very satisfactory, giving uniformly positive results with genuine and well-marked typhoid cases, and not reacting with non-typhoid bloods when attenuated cultures were employed.

Although the use of serum undoubtedly enables the results to be recorded and compared with greater scientific precision, we find that dried blood answers just as well for routine diagnostic work.

The alterations in reaction, induced by very slight modifications of the manner of testing, help to explain differences in the results reported by experienced and careful observers. With the same blood and culture, the amount of dilution possible largely depends on whether plain bouillon, bouillon culture or water is used for diluting. Opinions also vary as to what should be regarded as constituting a reaction. Personally, we do not think that anything less than complete clumping and total arrest of motion obtainable by the dry as well as the moist test in a young attenuated culture, should be regarded as typical.

PREVENTION OF MALARIA.

By SURGEON-MAJOR J. H. TULL-WALSH.

It is always a sad reflection that our knowledge of the means of preventing *malaria* is certainly in advance of our ability to put it into practice. Want of money or the apathy which is the outcome of ignorance continually stands in our way; but, nevertheless, as an incentive to us, we are able to point to many of preventive measures when directed to the removal of some of those conditions which have been recorded as naturally favourable to the growth and reproduction of the *plasmodium malariae*. I have pointed out in a former article that the chief sources of infection are air and water in *malarial* regions, and our attention will therefore be mainly directed to improving the condition of these two important factors in a healthy life.

Improvement in the atmosphere of *malarial* areas will follow on certain improvements in the soil from which the contamination arises. The first of these improvements is undoubtedly drainage, by which the nidus, favouring the growth of the *plasmodia*, is deprived of the moisture necessary for their development.

The study of the Sanitary Reports for Bengal for a period of ten years (1883-1892) brings out a great consensus of opinion on the part of all medical officers serving in *malarious* districts to the effect that the remedy lies in the improvement of local drainage, water-supply, and conservancy. In all these matters the rural parts of Bengal, and even most of the towns, are very deficient.

There is one district which may be taken as an example of the advantages of natural drainage. Year after year it has been noted that the district of Puri in Orissa is remarkable for its comparative immunity from *malarial* fevers.

During part of the year 1888-89, and part of 1890, while acting as Civil Surgeon of Puri, I enquired carefully into the probable causes of this freedom. The explanation was found in the physical conformation and general 'lie' of the country, and I supplied the Sanitary Commissioner with a note somewhat as follows:—

The total number of deaths from 'fever' in the Puri district during 1890 was 4,754, and these deaths were reported from 2,354 villages out of a total of 5,166. The conditions as regards sub-soil water and natural drainage are very different in the two sets of villages—those in which deaths from *malarial* fevers occur, and those from which *malarial* fevers are practically absent. The deaths were distributed over the six registering circles as follows:—

Circle.	Deaths.	Ratio per 1,000 of Population.
1. Puri (town)	523	21.10
2. Pipili	1,412	6.22
3. Puri (rural)	1,010	5.11
4. Gope	732	6.30
5. Khurda	836	3.10
6. Banpur	241	4.46
	4,754	5.35

Puri town, which shows the highest death-rate in proportion to the number of inhabitants, lies on flat ground and is yearly almost surrounded by a very large area of flood water during the rainy season (June to September), and, as would be expected, the deaths from 'fever' are most numerous when this water begins to disappear, in October, November, and December. The death-rate would no doubt be still higher but for the fact that as the waters recede and dry up much of the land is immediately cultivated. The areas of the Pipili, Gope and Puri (rural) circles are also somewhat flat, and especially in parts of the Gope circle the land is much flooded. Puri (rural), however,

includes a large sandy tract in which drainage towards the sea and Chilka Lake is fairly rapid and relieves the soil from any excess of sub-soil water. This condition reduces the death-rate in that area. The two last circles, Khurda and Banpur, are composed principally of high lands, with hills of porous *laterite*, and metamorphic rocks, and are most favourably situated with regard to rapid natural drainage. Banpur consists almost entirely of hills from which storm-water flows rapidly, and on which the people are particularly free from *malarial fevers*, only 241 deaths having occurred during 1890 in that circle. Khurda has also a capital natural drainage through the *laterite*; indeed, this circle is not unfrequently visited with drought. The low death-rate then in Puri (rural), Khurda and Banpur tends to keep down the figures for the ratio per mille of the total population of the district.

This special instance suggests also the value of agriculture which keeps the soil open and gets rid of excessive moisture through the growth of the crops and through evaporation from the leafage. Drainage and agriculture combined removed *malaria* from large tracts in England, which even in the time of Queen Elizabeth and after were scourged by *malarial fevers*. As knowledge increased, and pestilence caused people to look around them, more attention was paid to draining the swampy haunts which existed even in and on the edge of the city of London. Greater attention was paid to agriculture, and as the land became tilled and covered with useful vegetation, the predisposing causes, and with them *malaria*, disappeared. Even in 1685, to use the words of Macaulay, the peasant "snared wild-fowl on the fen which has long since been drained and divided into corn-fields and turnip fields."

The Roman Campagna was not always an unhealthy marsh, and may still some day be redeemed. Indeed, much is being done in this direction, and, as an example of what may be accomplished, one may see along the Via Ostiense the Tre Fontane, the supposed site of St. Paul's martyrdom, where the Trappist monks have converted a most deadly swamp into a healthy region "bright and wholesome with cultivation."

In addition to draining swampy lands which cannot readily be cultivated, it is well to plant them with quick-growing trees and plants such as the *eucalyptus* tree and the sunflower. The *eucalyptus globulus* is a tree of quick growth with deep-searching and wide-spreading roots; it is further thought by some to act antiseptically on the air of marshes. The evaporation from its leaves helps to keep the soil drained, and when the trees have grown into a 'belt' they will probably act as a barrier, preventing further passage of poison-laden air from the *malarial* spot. Rank herbage and undergrowth are objectionable and

should be removed. The growth of short close grass should be encouraged. Enough has been said in the article treating of methods of infection to show that another prophylactic precaution lies in the avoidance of impure water in *malarious* districts, and this applies with greatest force to stagnant marsh or pond water. If we are obliged to take our water from *malarious* sources it should always be boiled for drinking purposes. It may be filtered afterwards with advantage, but filtering alone is not sufficient. As boiled water is unpalatable, it may be aerated by various methods, the most simple being that of pouring the water from a height into clean vessels. Drinking tea, coffee, etc., ensures the boiling of the water and the destruction of the parasite. It has been proved numbers of times, and is my own experience, that those who drink beer and wine while working or travelling in *malarious* districts suffer less than those who drink the water without taking proper precautions. Thus, apart from the tonic effect of beer and wine, the consumer avoids the dangers of impure water. Spirits have not the same value, and it is a vain hope that you will make impure water pure by adding whisky or brandy to it.

The water of marshes and tanks should therefore be avoided, and water brought to the inhabitants from good wells or from wholesome sources in pipes. Water taken from deep springs and from artesian wells even in swampy parts is not so likely to prove deleterious, and rain-water can be used without fear if it is caught and stored in clean tubs or cisterns.

Next to drainage of the soil then it should evidently be our object to bring pure water into *malarious* areas.

The poison of *malaria* is, as a rule, most powerful near the ground, and on this account those compelled to dwell where *malaria* exists should raise their houses or arches or piles as far from the ground as possible, and should keep off the ground at night as much as possible. If it is necessary to work in *malarious* places, the workmen should sleep at some distance away on a healthy elevated spot, if one can be found, and they should not be sent to work too early in the morning before the mists have been dispersed by the sun. This same caution applies to troops on the march, and those in command should avoid swampy neighbourhoods when choosing camping grounds. They should further, when possible, avoid the most *malarious* season. This last caution is unfortunately difficult to carry out when the 'cool season' and the worst time for *malaria* coincide.

In the light of the infectious nature of *malaria* water, soil and plants from infected districts should not be permitted to be imported into healthy countries or regions where there are any natural conditions which might favour the growth of the *amœba* of paludism.

Dr. Anderson, writing of the *malarial fevers* of Mauritius, traces the origin of *malaria* in that place to the arrival of an emigrant ship, the *Spunky* from India in 1865. His description of the soil near Port Louis shows that all the conditions necessary for fostering the *malarial* parasite were present; and there is no doubt that, as stated by Dr. Anderson, *malarial fevers* increased greatly in the island from that time. It has also been suggested by Laveran that *malaria* was first introduced into the island of Réunion by means of plants or water from Madagascar.

Apart from the radical measures which would prevent *malaria* by redeeming the haunts of the *Plasmodium malarie*, there are other and personal prophylactic precautions which people, exposed to infection, may adopt with advantage. Strict attention must be paid to the general health, the habits must be regular, the diet good but simple, and there must be no excess either in eating or drinking. All unnecessary fatigue must be avoided, and the clothing must be sufficient and suitable, especially at night and in the early morning. I am of opinion that the best material to wear at all times in *malarious* districts is flannel. Small and regular doses of quinine should be taken, and when armies are on the march or gangs of workmen employed on excavations, etc., in *malarial* districts quinine should be freely distributed. When obliged to travel at night or to sleep in unhealthy spots a respirator might be useful. Emin Pasha (Stanley, "Darkest" Africa ii, 33) believed that mosquito curtains protected him at night from *malaria*.

Sulphurous emanations have been shewn by M. D'Abbadie to be obnoxious to *malaria*, and there is some reason to believe that smoking tobacco may act as a protection against the ingress of the *malarial* parasite from the air. In the Congo States Dr. Leslie, after 2½ years' experience speaks well of the prophylactic properties of arsenic, and Crudeli also advocates the use of this drug as a preventive, though much less valuable than quinine.

IS PERFORATION JUSTIFIABLE IN DELAY OF DELIVERY OF THE AFTER-COMING HEAD.*

By DR. KEDARNATH DASS,

Medical and Surgical Registrar, Medical College Hospital;
Late Resident Goodeve Scholar, Eden Hospital, Calcutta.

I BEG to bring before the profession a very short paper on a point of extreme interest, viz.—What is the greatest time a child can endure being cut off from placental and aërial respiration with special reference to the delay in the delivery of the after-coming head; and should the after-coming head be perforated after the cord has ceased to beat? The paper has been suggested (1) by the statements of some

of the recent English, American and Continental authorities—Robert Barnes, Ernest Herman, Cameron, Spiegelberg and others to the effect that after the lapse of a stated period—so many minutes—the child will die; and (2) by the happy result of two cases in which the head was certainly delivered after the complete cessation of the pulsation of the cord and not within five minutes after the birth of the trunk. In most of the text books no definite direction is given with regard to this point, except in Herman's "Difficult Labour." Barnes says: "Numerous observations lead me to conclude that the child will be asphyxiated beyond recovery if aërial respiration do not begin within three or at most five minutes after the stoppage of the placental circulation. I think it must be accepted as a general law that if the head compress the cord the child should be extracted within three minutes."*

The above statement of Barnes is explicit enough, but he does not say whether we should perforate the head or not if the child cannot be delivered by forceps after the cord has been compressed for three minutes. He leaves us to infer. He however cites cases where live children have been extracted by Cæsarian section within 10 to 23½ minutes after the cessation of placental circulation. Herman is more positive and says that "after the cord has ceased to beat, do not inflict on the mother any further risk of damage to her soft parts, but cease pulling, remove the forceps and take up the perforator. As a rule if the head is not extracted within five minutes after the liberation of the arms, the child will die." According to Herman then, we ought to perforate the head after the cord has ceased to beat. His statement about the death of the child within five minutes after the liberation of the arms may be taken too literally by the student and the young obstetrician, and be harmful to the interest of the child.† As representing the American view of the question I will quote the following: "Time is the great element in safe delivery after the cord has come into view. If the head is not delivered within four to eight minutes, the child will probably be still-born, or else deeply asphyxiated. Exceptionally children have survived fixation for 15 minutes" With regard to

* Lectures on Obstetric Operations.

† Difficult Labor (1895), p. 54.

‡ A third reason for writing this paper may be mentioned here. Recently I had occasion to question some students going up for their final examination, and all of them would count five minutes after the birth of the trunk, and if by that time the head could not be extracted by conservative means, they would take up the perforator.

1. A system of Gynecology and Obstetrics by American authors. Art. by Cameron, Obstetrics, Vol. II, p. 177.

2. Obstetric Surgery.

3. Text-book of Midwifery, Vol. II, p. 541 (New Sydenham Society).

4. A system of Gynecology and Obstetrics by American authors. Art. by Cameron, Obstetrics Vol. II, p. 243 (1889).

* A paper read before the Calcutta Medical Society.

the question of craniotomy on the after-coming head, the same author remarks that "craniotomy is not indicated upon the after-coming head of the living child. An obstacle to delivery which cannot be overcome without craniotomy will soon cause the death of the foetus."

If we scan the above statement we cannot but infer that if the head is not delivered within 4 to 8 minutes after the cord has come into view, the child will probably be deeply asphyxiated, its chances of being resuscitated becoming very little. He would not perforate the head of a living child, but does not say how soon after the cord has come into view, the child will be considered dead. Grandin and Jarman are more positive and would deliver the head within 3 to 5 minutes after the extraction of the arms to obtain a living child. The German school may be represented by Spiegelberg, who says: "The accoucheur must only persevere in his attempts to extract the head with his hands or with the forceps as long as it is probable that the child will be born alive, or that, if it is dead, the operation will not endanger the mother. Under contrary conditions it is best to desist for a time so as to allow the woman a time of rest unless special circumstances necessitates interference; he may afterwards try some milder mode of extraction. If his attempts then fail, delivery must be accomplished with the help of craniotomy."

Having given above the views of some of the recent authorities, I will relate two cases bearing on the point.

Case I.—I was called early in the morning of the 17th February 1897 to attend a labour case in which the trunk of the child was said to have come out, the head being arrested. The patient's house was about three minutes' walk from my place. To give an idea of the time that elapsed between the birth of the trunk and the birth of the head, I will relate in detail what occurred after the attendants thought that medical aid was necessary. The man who came to call me first went to another medical gentleman who lived closed by but could not attend. I was in bed and did not get up till about three or four minutes after his arrival. I told him to fetch a hackney-carriage, believing the patient's place to be at a distance, and it took him full five minutes before he could bring me one. On entering the lying-in-chamber, I found the cord absolutely pulseless. The after-coming (occipito-posterior) was delivered without much difficulty. I felt for the beating of the heart, and apparently there was none. However, as I was bent upon trying the effects of direct insufflation, I began mouth to mouth insufflation at once, though I confess only as an experiment. After a time the heart's beating became distinct, and after 27 minutes the child attempted to take an inspiration. In 10 minutes more it began to breathe, though not naturally. The child is still alive. At the lowest computation 20 minutes must have elapsed after

the birth of the whole trunk before the head was delivered.

Receiving information	...	1 minute.
Going to 1st Doctor's house	...	3 minutes.
Coming to my place	...	2 "
Rousing me and conversation	...	5 "
Fetching hackney	...	5 "
Going to the house	...	2 "
At the house	...	3 "
		21 "

In the above case the head was delivered at least 20 minutes after the birth of the trunk. The cord was pressed, and we might presume the placenta also separated.

Case II.—This case occurred in the Eden Hospital, and, with the kind permission of Dr. Joubert, Obstetric Surgeon, Eden Hospital, I am able to give the following detailed history of it:—

Mary Anthony, *æt.* 30, Madrassi, 1-para, was admitted into the Eden Hospital at 12-30 P.M., on 7th April 1897, with the following history:—She was in labour since 9 P.M. of 6th April 1897. Membranes ruptured some time during the night. On admission, temperature 100° 2F. Pulse full and frequent. Foetal heart sounds clearly audible (though weak). *V. E.*—Os three parts dilated; breech presenting—S. L. A. There being no progress, at about 3-30 P.M. a foot was brought down by the House Surgeon, and by steady traction the body was delivered. The cord was found cold and pulseless. The arms became apparently extended, and there was no further progress. As the cord was pulseless, no attempt was made to hurry up. At this time I entered the confinement-room, being desirous of seeing the operation. The House Surgeon, Dr. N. N. Basu, kindly explained to me what he did, and told me that the child was dead. I, however, suggested to him rapid delivery, in spite of his firm belief that the child was dead, having had the result of the previous case fresh in my memory. The arms were liberated with considerable difficulty. The position of the right arm was little short of dorsal displacement. The head was very large and was delivered without much difficulty. The child was deadly pale, limbs hanging listlessly, mouth open, heart's sound not perceptible. The child was delivered more than eight minutes after the complete cessation in the pulsation of the cord. I began mouth to mouth insufflation, though every one in the room thought that it would be impossible to revive the child and asked me not to attempt it. After a few minutes heart sounds became perceptible, and, after 40 minutes' patient work, the child took its first jerky, short inspiration and began to show reflexes.

Occasional short attempts at inspiration were made during the next 20 minutes, after which period I could do away with insufflation. Artificial respiration resorted to as help, during the next 10 minutes, when we handed over the child to the care of a nurse. In this case the

child could be resuscitated at least 8 minutes after the complete cessation of the pulsation of the cord.

Of course none of the authorities quoted above would perforate the head of a live child, but the practical question to determine is,—*When should we consider the child as dead?* This leads us to the question of the signs of a dead child, and the only sign with which we are concerned for purposes of the present paper is "the absence of pulsation of the umbilical cord." With regard to this point only two of the older writers, Smellie and Ramsbotham, are definite. Smellie says: "One may also certainly pronounce the child's death if no pulsation hath been felt in the navel-string for the space of 20 or 30 minutes."* Ramsbotham says: "We may safely regard the foetus as dead if the pulsation in the prolapsed funis have entirely ceased for the period of 30 or 40 minutes."† He would perforate after making sure that the foetus is dead. It is safe to follow Dr. Ramsbotham's advice. If forceps traction fail, there must be some grave disproportion between "the passage" and "the passenger," and in our prolonged attempts (we should say *for 30 minutes after the cord has ceased to beat*) to deliver, we are sure to kill the child, and then we would not hesitate to perforate. If we do succeed in getting the child out un mutilated, though gravely asphyxiated, there will at least be some chance of resuscitating it. It is evident that by the words "after the cord has ceased to beat" Dr. Herman means the death of the child. But the facts stated above clearly show we can get live children even 20 minutes after the cord has ceased to beat. The conclusion then is that in simple delay we should not be justified in perforating the head within at least 30 minutes after the cessation of the pulsation of the cord.

A Mirror of Hospital Practice.

CASES OF UNDIAGNOSED LIVER ABSCESS.‡

By SURGN.-CAPT. D. M. MOIR, M.A., M.B.,
Presidency General Hospital, Calcutta.

(Concluded from page 218.)

Case II shows that a liver abscess may disorganise the whole of the left lobe of the liver without its existence being suspected, and that the thoracic and abdominal viscera may become extensively involved by secondary inflammation, while the temperature remains normal, or subnormal, with only occasional mild pyrexia of short duration.

ALTHOUGH this case was in my wards for periods of 43 and 31 days, yet I frankly confess I excluded from the diagnosis the possibility of hepatic abscess until the abdomen was opened at the *post-mortem*. A. B., *æt.* 37, an engine fitter, European, born in India, was admitted on the 3rd December, 1896, suffering from an acute attack of indigestion.

On admission.—He gave an account of having indulged in a heavy supper late on the previous night, consisting chiefly of meat, potatoes and eggs. This was quickly followed by an attack of colic, which kept him awake all night, and forced him to come to hospital early in the morning.

An emetic was administered, which afforded him almost immediate relief. The vomited matter contained large pieces of undigested meat and potatoes. A purge was given later, and this also seemed to do good.

The notes of both the admitting officer and of the Assistant Surgeon in charge of my wards stated that the patient experienced dyspnoea, with pain and oppression in the lower part of the chest, and also pain, tenderness and distension of the abdomen. But special mention was made that there was no enlargement of the liver or spleen, though the heart's action was somewhat weak, and the respiration was rather faint at the back of the right lung. I have reason to believe, however, that the abdominal distension must have pushed up or obscured the area of liver dullness, because a few days later I found the lower border of the liver in the mammary line extended downwards 2 inches below the costal margin.

Previous illnesses.—Inquiry elicited the fact that he had been only once seriously ill, when he suffered from "obstruction of the bowels," for which he was treated during five months in a Bombay hospital in 1894. He was two years in Bombay, and used to suffer from occasional attacks of "fever" in the rainy season while there.

[After his death I discovered quite by accident that the patient had been admitted into the wards of one of the other Medical Officers of the Presidency General Hospital, Calcutta, on the 26th October 1896, for the treatment of bronchial catarrh, and that he was discharged a week later, on the 2nd November, at his own request. The cough disappeared in the course of three or four days; but other troubles were discovered. His pallor led to inquiries which revealed that he had been voiding a small quantity of blood at stool during the preceding six or seven months, but he did not consider this worth mentioning, since it caused him no pain nor inconvenience. A rectal examination showed that there was prolapse of the rectal mucosa, along with a hæmorrhoidal condition about the anus. The notes of his case further state that formerly he had been a heavy drinker, and that he still indulged to excess occasionally.]

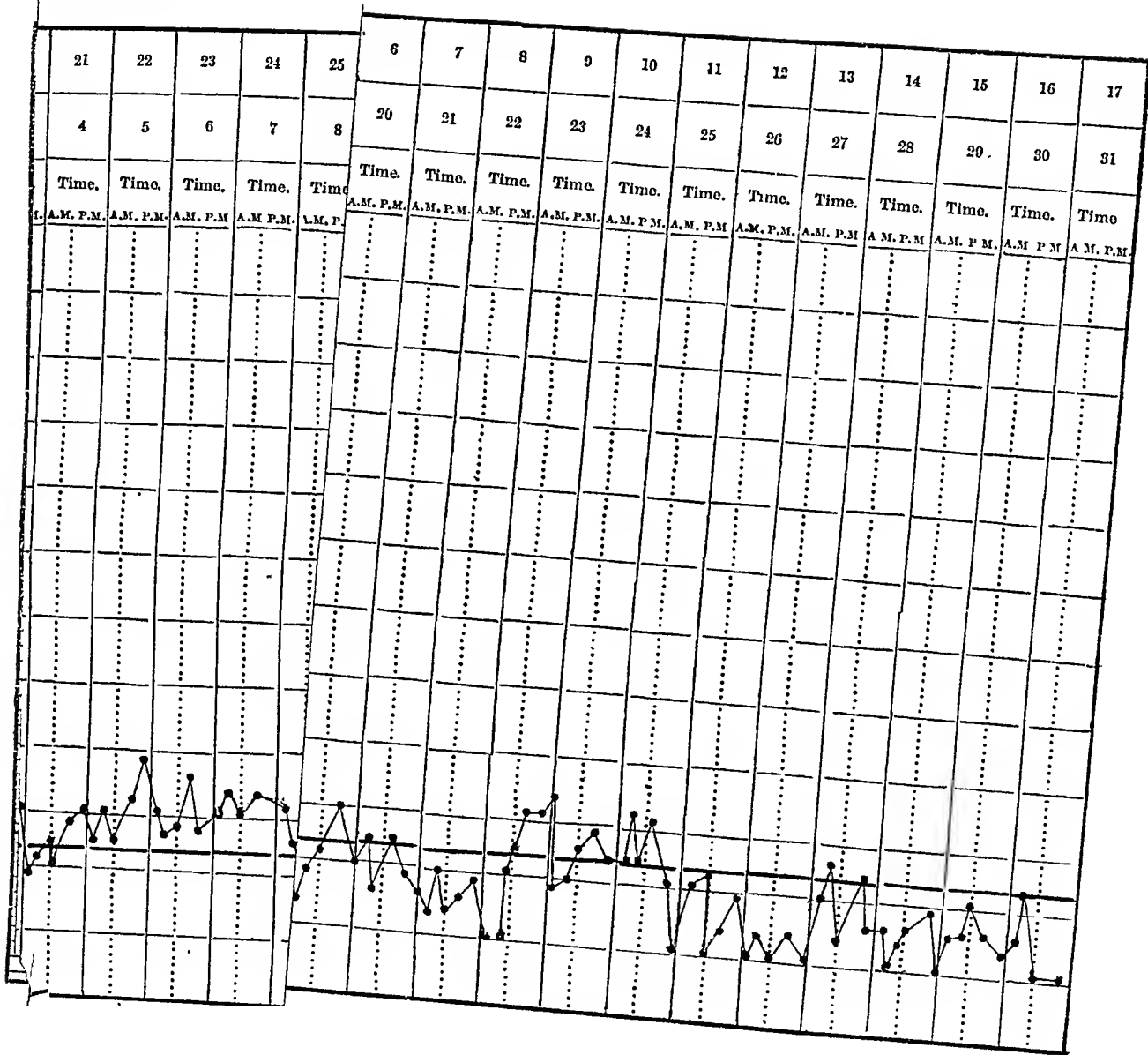
* Smellie's Midwifery, Vol. I, p. 289. (New Sydenham Society.)

† Ramsbotham's Obstetric Medicine and Surgery, 1th Edition, 1866, p. 317.

‡ Our readers will note the chart is dated for August; it, as a matter of fact, was intended for the issue of that month, but was unavoidably crowded out.

SCCESS. CASE II.

er Abscess.



This is interesting, because here we have the two most fertile causes of liver abscess, *viz.*, a lesion of the rectum and its veins, and abuse of alcohol. I was not cognisant of either of these facts while he was alive.

Examination of the heart, liver and spleen on this previous admission revealed nothing abnormal. During his stay in hospital it was noted that his breath was foul and his tongue furred, and that the breath sounds were somewhat diminished at the base of the right lung. All these conditions were found on his subsequent admission already detailed.]

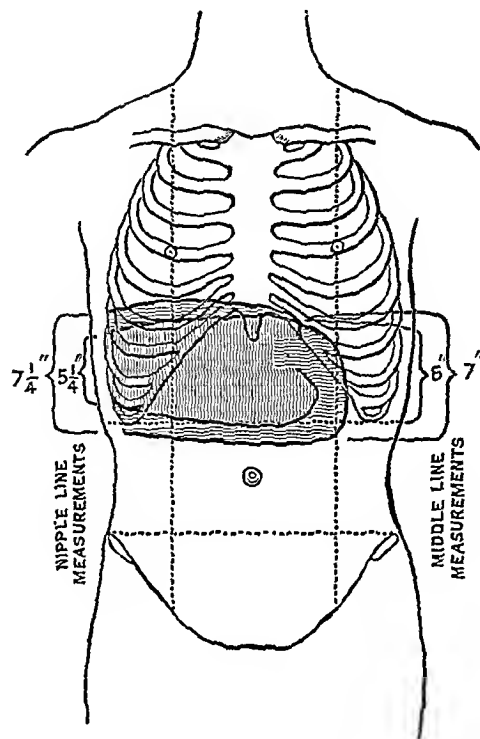
I do not believe the patient had any desire to suppress mention of the above hospital admission, the details of which are given within brackets. He was naturally careless and inexact, and he probably did not think the particulars could have any bearing on his subsequent illness. I may mention that his head was of a very peculiar shape, the frontal region being remarkably flat and receding, and the occipital region abruptly vertical. His education was defective, and his mental processes were dull and slow, so it is not surprising that his powers of observation and expression were below the average, and that his description of subjective phenomena was misleading. To him his whole trouble seemed to be centred in his alimentary canal. As an example of his inaccuracy of statement I notice that he gave three different ages—35, 36 and 37 years—on his three admissions to this hospital, although these occurred all within four months.

Subsequent course.—During the first week after admission his symptoms and treatment were those of acute gastritis. On the 9th and 10th December he seemed well; but there was another gastric attack on the 12th, all trace of which passed off by the 16th December. From the 20th December onwards until his discharge on the 14th January, 1897, he appeared convalescent as regards freedom from the subjective symptoms of gastric derangement.

His symptoms during an attack may be summarised thus:—*Subjective.*—Anorexia, loss of taste, extreme thirst, inability to assimilate solid food, nausea, vomiting, and flatulence; pain varying in site and in intensity, sometimes dull, and at others cramp-like, occasionally general all over the abdomen and lower part of the chest, or located in the left hypochondrium, right iliac fossa, or mediastinal, behind the lower end of the sternum; occasional attacks of dyspnoea, a paroxysmal feeling of tightness or oppression across the lower part of the chest; rarely a slight cough, supposed to be reflex and of gastric origin; sleeplessness, and once giddiness.

Objective.—Anxious expression, right pupil dilated; bowels irregular, constipation or diarrhoea; abdomen hard, distended, and tender on palpation. The tongue was persistently foul, thickly coated with a white or brown fur, flabby,

indented, and sometimes fissured. The other constant symptoms were,—dilatation of the stomach, slight splashing, and metallic tinkling on auscultation. The area of dulness in the hepatic region was increased. It reached its maximum on the 26th December, when the dimensions were as figured in this diagram, *viz.*,—



Total hepatic dulness in the right nipple line $7\frac{1}{4}$ inches; in the middle line 7 inches. Absolute dulness in the mammary line $5\frac{1}{4}$ inches; in the middle line 6 inches. After this the measurements decreased from 1 to $1\frac{1}{2}$ inches at subsequent examinations.

His weight increased from 100lbs. on the 21st December to 105lbs. on the 4th January, which was the maximum.

Temperature.—Only on 7 days did his temperature reach 99°F. or over, and even then the rises were merely temporary, *viz.*, on the 3rd, 4th, 6th, 7th, 11th, 12th and 13th December. On only two occasions did it reach 100°F. , *viz.*, on the nights of the 6th and 12th December, and the maximum rise was $100^{\circ}2\text{F.}$ on the former of these nights. During the rest of the six weeks he was in hospital in December and January his temperature remained normal.

On the 9th January he wanted his discharge with a view to resume work. I advised him to remain; but he left hospital on the 14th January, 1897, considering himself quite fit for his usual duties.

Diagnosis.—From the above facts I deduced that there was a tumour either above or below the diaphragm, which displaced the liver downwards and gave rise to the increased area of dulness. Further, that the tumour probably embarrassed the heart's action, caused spasm of

the diaphragm in certain conditions, and also interfered with the stomach. The dilatation of the stomach I attributed to kinking or obstruction at the pylorus by pressure, or by adhesions, which also interfered with the peristaltic movements of the stomach. I also kept in view the possibility of the cardiac embarrassment being due to the gastric dilatation, and that the latter might be connected with some band or adhesion associated with the attack of intestinal obstruction three years previously.

It may be asked, Why was no exploratory laparotomy performed? The answer is that I did not consider him a suitable subject for chloroform, or his case one amenable to operation, owing to probable adhesions of the tumour to numerous vital structures which surrounded it.

Two days after leaving hospital he had another attack of acute dyspepsia, and felt feverish after returning from his work on the night of the 16th January. Next day he was seriously ill, and suffered from colic, chills, and a slight cough.

Readmission on the 18th January, after an absence of only four days. His condition was very much worse than during his former stay in hospital. All his previous symptoms recurred in an exaggerated form. In addition he had fever, cough, and a tightly distended, tender abdomen. By the 21st January he felt a good deal better, and continued fairly easy till the night of the 26th January, when there was a sudden recrudescence of acute symptoms. From that time onwards there was continual tympanitis; his stomach remained greatly dilated, as also the colon. Next day friction was detected over the pericardium and lower lobe of the left lung. On the 28th January diaphragmatic pleurisy was diagnosed as a complication, owing to the friction at the base of his lungs, hicough, cough, gastric irritability and vomiting of greenish fluid with undigested food, painful and tense abdomen, and referred pain in the right iliac fossa. There was again a lull in the distressful symptoms on the 30th January.

On the 1st and 2nd February the stools were like clay in colour and in consistence; but, before and after that, the motions were bile-stained, and there was never any jaundice. On and after his readmission the area of hepatic dulness appeared less, but it was recognised that this was probably due to the tympanitic state of the abdomen, which obscured the lower limit of liver dulness. The girth of the abdomen at the umbilicus used to vary from 29 to 30½ inches, according to the degree of tumidity present.

He became gradually weaker and more prostrate, and, on the 7th February, he was unable to sit up, lie on his back, or turn over in bed. The urine was last examined on the 12th February. No albumen was ever detected, though there was frequently an abundant precipitate of phosphates.

On the 16th February his face became puffy and his feet slightly cedematous, and he suffered from continual and severe pain in the abdomen, which spread to his chest later in the day. Ascites had been suspected for some little time, but no thrill was ever clearly elicited. He became suddenly worse; acute dyspnoea, cyanosis, and cold sweats set in, and he appeared moribund. Nevertheless he lingered on till the evening of the 17th February, when he died.

Temperature.—During the first three days after readmission, from the 18th to the 20th January, there was some fever, and the temperature ranged from 100° to 101° at night. For the next six days the temperature varied but a few points above or below 99°, and this happened again from the 9th to the 11th February. But from the 27th January to the 8th February, and again from the 12th to the 17th February, his temperature was chiefly subnormal, varying from 97° to 98°, and rarely a few points above this. It is a striking thing that on 19 out of 31 days of his last admission to hospital there was an entire absence of pyrexia, in spite of the extensive inflammation and suppuration revealed *post-mortem*.

Post-mortem examination.—On opening the abdomen about a pint of clear yellow fluid escaped, which had been confined in pockets formed by the matting together of the viscera.

Liver.—The left lobe was adherent to the back of the anterior abdominal wall, diaphragm, stomach and omentum. Its substance was destroyed and converted into a huge abscess consisting of thick, greyish yellow pus and disintegrated liver tissue. The *right* lobe had a "nutmeg" appearance, and was quite unconnected with the abscess.

Stomach.—There was well-marked dilatation, which had evidently been brought about by the kinking and drawing up of the pyloric end. The latter was adherent to the left lobe of the liver, to the gastro-hepatic omentum and to the diaphragm, in such a manner as to alter entirely the axis of the viscus as a whole. The rest of the stomach was matted by adhesions to all the surrounding structures, including the diaphragm, the spleen, and the colon in its transverse and splenic flexure portions.

The spleen was not enlarged; but it was enclosed in a mass of adhesions involving such viscera as the stomach and the tail of the pancreas. *The intestines*, mesentery, and omentum were all matted together, and in places formed pouches containing fluid. On opening the thorax the *pericardium* showed marked evidence of thickening from *external* and *internal* pericarditis. The former resulted from the close relation of the pericardium to the diaphragm over the abscess in the left lobe of the liver. The latter was most marked at the base of the heart.

The right pleural cavity contained a quantity of liver pus, which had burst through the

diaphragm the day before death occurred. *The left pleural cavity* contained a little clear fluid, and some curdy flakes.

The visceral pleura of both lungs showed extensive pleuritic adhesions and thickening on the diaphragmatic, anterior and posterior surfaces of both the lower lobes. There was well-marked venous congestion of the lungs.

AN IMPROVED PATTERN OF "GIANT" LITHOTRITE.

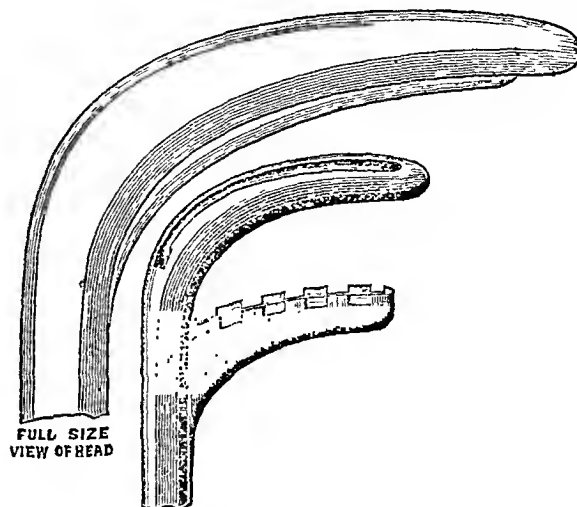
By D. F. KEEGAN, F.R.C.S.,
Brigade-Surgeon Lt.-Col. (retired).

I WOULD direct the attention of those who are interested in the surgery of stone in the bladder to an improved "giant" lithotrite which, at my suggestion, Messrs. John Weiss & Son have devised and constructed for dealing with very large calculi by perineal lithotrity. Surgeon-Captain Henry Smith, Civil Surgeon of Jullundur, when stationed at Guzerat in the Punjab, devised the "giant" lithotrite described by me in my recent notes on stone in the bladder. Some defects were found in this instrument which have been remedied in the improved pattern figured in the annexed plate. Experience has taught us that suprapubic lithotomy has not fulfilled the early promise of the days of its revival, for the mortality which has followed it in cases of very large calculi, occurring among males at the middle period of life, is very considerable.* There is, therefore, a growing consensus of opinion among surgeons practising in the East, where cases of very large calculi are of frequent occurrence that perineal lithotrity, whether median or lateral, will, in the near future, supersede suprapubic lithotomy in dealing with this very important class of cases of stone in the bladder. There need, however, be no rivalry between perineal lithotrity and litholapaxy: rather should they be considered complementary, one to the other. This improved instrument is made on the model of an ordinary Thompson's lithotrite with the following exceptions. The male blade, instead of being joined to the screw at the handle end, is, for greater strength, left in two parts, the one terminating at the button, by means of which it is withdrawn, the other or screw portion working independently through a fixed collar at the end of the handle, instead of by means of the usual forceps catch. In place of the wheel, it has a large winged handle $4\frac{1}{4}$ inches across, which gives an extra purchase in working. The dimensions of the instrument when closed are—

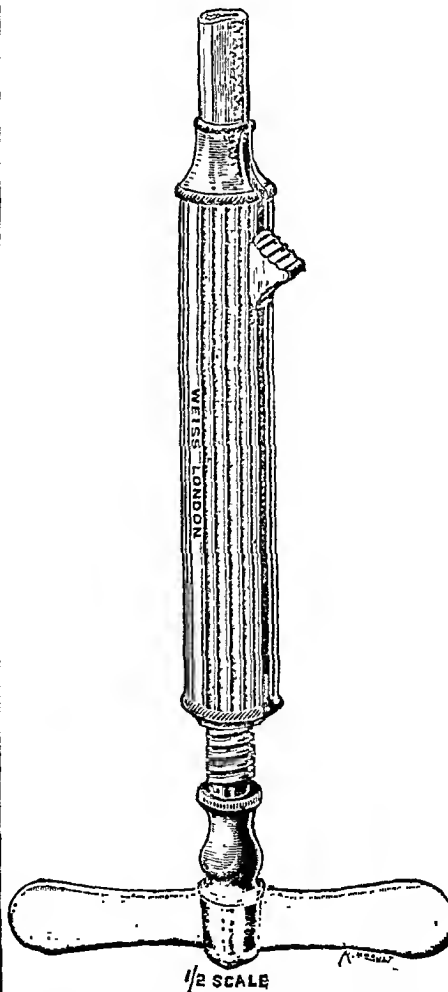
Length over all ...	18 inches	Size of stem ...	No. 20
Do. of blades ...	11 "	Do. stem at angle ...	25 $\frac{1}{2}$
Do. of hollow handle ...	5 "	Do. of point ...	16

The jaws stand $2\frac{1}{4}$ inches for female and 2 inches for male blade, above the shaft, and

open sufficiently wide to take a stone of a diameter of over 4 inches. This instrument can be readily passed into the bladder through a small lateral incision in the prostate or through an incision made as in median lithotomy, and it will readily break up a hard calculus



FULL SIZE
VIEW OF HEAD



$\frac{1}{2}$ SCALE

weighing between six and eight ounces. The calculus thus crushed can be withdrawn from the bladder by forceps or removed by means of an aspirator attached to a very large evacuating cannula, according to the predilection of the surgeon. The operation is completed in a short

* *Lancet*, January 30th, 1897.

space of time, a matter of vital importance where men who have passed the middle period of life suffer from the presence of very large calculi, and the neck of the bladder and prostate are not stained nor bruised in an endeavour to extract a large calculus, whole through the perineum. I feel confident that the great mortality which has hitherto followed suprapubic lithotomy in dealing with such cases will be considerably reduced by carrying out a perineal lithotripsy.

A CASE OF GASTRO-INTESTINAL CATARRH: SPEEDY AND UNEXPECTED RECOVERY.

By B. SUBBA ROW, C.M.S.,

In Medical Charge, Famine Relief Camps at Marella, &c., Pathikonda Division, Kurnool District; late Medical Officer, Pamidy.

AT 7 P.M., on the 6th December 1896, when I was in medical charge of the civil dispensary at Pamidy, I was called to see a woman living in a village 2 miles off, and who was said to be suffering from severe abdominal pain.

On arriving at the village, I found the patient very weak, so much so that she could hardly maintain the erect posture. She had been a well-nourished healthy young woman, though not "fat, fair, and forty," until quite lately. The first departure from her health occurred about a month ago, when she was, all of a sudden, attacked with severe aching pain in the left hypochondriac region. At first the pain commenced soon after each meal, and lasted for a few minutes only. After a week, however, its duration gradually lengthened until at last it was never altogether absent: her appetite daily failed. As the disease advanced, vomiting and diarrhoea, accompanied with high fever, set in, and she was confined to bed for several days.

PRESENT STATE.

Integumentary system.—Skin rough and dry, and partly covered over with big drops of perspiration. Temperature in the axilla subnormal.

Circulatory system.—Pulse feeble, small and irregular; 72 per minute, slight uneasiness over cardiac region, but physical examination elicited no organic lesion of any kind.

Respiratory system.—External form of chest, state of respiration, &c., normal. The resonance of thorax is in no way altered. On auscultation, the breath sounds are normal.

Digestive system.—Lips pale and dry, tongue coated over with a thick fur, anoroxia, and vomiting of a greenish tinge attended with flatulence. The abdomen is flat and slightly retracted; no pain or tenderness on pressure, but the excruciating colicky pain complained of was spontaneous and appeared to radiate from about the middle of the descending colon, and extended as far as the level of the umbilicus.

The alvine discharges were darkish brown in colour, highly fetid in odour, and grumous in consistence, though sometimes fluid and frothy, and were evacuated as many as twenty times in the course of twenty-four hours.

Nervous system.—Complains of occasional attacks of headache, giddiness, restlessness, and pains all over the body.

Urinary system.—Micturition normal; reaction acid; specific gravity 1.020; no sugar or albumen.

TREATMENT.

The following draught was ordered, and she was put on slops and milk diet:—

R

Tinct. opii	...	m. x
Mist. olei ricini	...	5 i

Misc. ft. haust.

Sig:—Statum sumendam.

The next day I prescribed for her the following powders:—

R

Salol	...	grs. x
Bismuthi salicylas	...	
Sodii Biscarbonas	...	aa. ,, v
Misc. ft. pulv.		

Mitte tales iii.

Sig:—One powder to be used as directed.

The constant unbearable pain was relieved a good deal after using five of the above powders; it had almost ceased at the end of the third day of treatment. Vomiting occurred but twice during the course of these three days. The alvine discharges also were evacuated less often than before. From the fourth day she had sound refreshing sleep, and the stools improved in odour, colour, and consistence. On the fifth day she had a healthy, though somewhat soft, motion. At the end of a week she had progressed favourably; none of the morbid symptoms returned. In less than a fortnight she had gained considerably in flesh and strength; there was a return of appetite, in consequence of which a liberal, but easily digestible, diet was ordered. From this time her recovery was speedy and uninterrupted.

REMARKS.

The case is interesting, not only because the recovery was speedy and uninterrupted, but also because such a favourable result could not be expected from the deplorable condition in which she was when I first saw her with her emaciated and gaunt features which more resembled those of a spectre than those of a healthy young woman. She had been for over a month under native treatment which made her worse day by day; till at last her medical attendants (for there was more than one) giving up all hope of recovery pronounced her to be possessed, and the case as hopeless. Some kind neighbours pitying her condition prevailed upon her relatives to try English treatment which brought her round in less than a fortnight. I had the occasion of seeing her again lately, and she continues to be a picture of health.

THE STANDARD.

A Scottish Life Office of 70 years' standing, and one of the wealthiest and most progressive of the Provident Institutions of the United Kingdom.

DOUGLAS STEWART,
Secretary,
Standard Buildings, Dalhousie Square,
CALCUTTA.

Indian Medical Gazette.

SEPTEMBER, 1897.

ENTERIC FEVER IN RANGOON.

FROM the *Rangoon Gazette* we gather that typhoid fever has prevailed in Rangoon to an abnormal extent during the year and has been the subject of a series of questions in the Municipal Council. The questions and answers were as follows:—

(1.) "To what extent has typhoid fever prevailed in Rangoon Town and Cantonments during the past year? Is it now prevalent? What special measures have been taken to prevent it? (2.) Whether it is a fact that the night-soil and garbage of 14,500 people living in Cantonments are buried in Cantonments, and whether, in the opinion of the Health Officer of the Municipality, this is not dangerous to the health of the whole community? (3.) What steps are now being taken to increase and improve the water-supply of Rangoon, and when is it probable that the supply will be increased? (4.) Whether the water of the Victoria and Royal Lakes is contaminated by house drainage? (5.) How many hundreds of cart-loads of stable filth have been deposited on the slopes of Dalhousie Park, and whether, in the opinion of the Health Officer, this might contaminate the water of the Royal Lake?"

The President said that he had consulted the Health Officer with regard to Mr. Hock Gwan's questions and would answer them seriatim. A distinct answer as to the extent to which typhoid fever prevailed could not be given, as the notification of infectious diseases was not compulsory (except plague) and were seldom reported; and of course notification of disease in Cantonments need not be, and seldom was, sent

to the Health Officer. No special steps were being taken generally to prevent the spread of typhoid. When a case came to the notice of the Health Officer and he found that the surrounding condition demanded attention, steps were taken to improve them. The measures necessary to prevent the spread of the disease were usually taken by those attending the patients. The Health Officer necessarily could only attend to the cases brought to his notice. Mr. Hock Gwan also asked "whether it is a fact that the night-soil and garbage of 14,500 people living in Cantonments are buried in Cantonments, and whether, in the opinion of the Health Officer, this is not dangerous to the health of the whole community?" They had no information of a definite character as to the disposal of night-soil and garbage in Cantonments and they had not the right to investigate those matters in that district, unless, perhaps, there was distinct evidence that the Municipality suffered from the practice followed there. It was known, of course, that both night-soil and garbage were buried in Cantonments. The Health Officer could not give any opinion on the matter on the information at his disposal, but he was aware, as he had been consulted in the matter, that the most crowded portion was receiving careful attention. Mr. Hock Gwan further asked "what steps are now being taken to increase and improve the water-supply of Rangoon, and when is it probable that the supply will be increased? The report of the well-boring Sub-Committee was in the press and would be in their hands in a few days. The surveys for the Thamine Lake were nearly completed, and the report regarding that lake was expected to be ready in about two months. In answer to the fourth question, he (President) would say that undoubtedly the drainage from houses went into both the Victoria and Royal Lakes, and again and again that had been protested against. The only remedy was to cease using the Royal Lake as a reservoir and to acquire the water-shed of the Victoria Lake. He might mention, however, that the presence of sewage in the water was not apparent on analysis, but the fact that house drainage found its way into the water rendered it imperative that either the water should not be supplied for domestic purposes, or that steps should be taken to prevent the pollution. Neither of those could be done until a water scheme had been decided upon, and the

sooner that was done the better. It was difficult to give the exact figures of cart-loads alluded to in question 5, but there were a thousand during the last ten years. The Health Officer had called attention to the contamination of the water of both lakes, but he says that the analyses of the water did not suggest that the supply was a dangerous one, and he said he had no evidence that it exercised a deleterious effect on the health of the town. He remarked further that it was of a far better quality than the alternative supply from wells, excepting a few tube wells of course. Of course a lake in a public park and garden was not, and could not be, a proper reservoir, and the sooner it ceased to be one the better. At the same time there could be no more harm done by manuring the park lawns in dry weather than the water would receive from the washing of filth into it in the rains from the roads round the lakes and the houses on its water-shed, and the blowing of the dust and manure into it from the roads in the dry weather. He might add that there was no intention to manure the Dalhousie Park for the next three years, and it was to be hoped by that time the Royal Lakes would be no longer required for drinking purposes."

It will be seen from the above that Rangoon is not in a satisfactory condition as to its health administration, and the President makes clear in his answers where the defects lie. The first defect is a lack of information as to what is going on in town as regards the public health, without which the Health Officer is powerless. It is practically impossible to separate the Cantonment, which occupies a central position in Rangoon, from the town itself. Whatever happens to the health of the town within Cantonments is likely to affect the town within municipal limits and *vice versa*. It is essential for the public health of both that the Health Officer should know what is the nature and the prevalence of sickness and mortality in the Cantonments, and it is equally essential for the Cantonment authorities to be aware of what is happening within municipal limits. This can be best secured by notification to the Health Officer of communicable diseases by the medical practitioners attending cases within or outside Cantonments, and no time, we think, should be lost before Rangoon secures such powers. The weekly and monthly reports of the Health Officer will inform the Cantonment authorities of the disease pre-

valent in the town and in their own district.

The next defect is also a grave one, which can only be dealt with by abolishing the system that has given rise to it. No Cantonment, situated such as that in Rangoon, should be permitted, in the interests of the general community, to bury its night-soil and garbage within its own boundaries. Cantonments in isolated localities, and jails in more or less populous places, may be able to effectually, and without injury to health, trench their night-soil, but this is no guarantee, nor is it a reason that the same system under different conditions can be followed with impunity within the confines of a large city. Experience is everywhere against it, and Rangoon is only suffering in the same way as other towns which have carried out a similar policy.

The third defect, and the last one to which we shall refer, is the evident reluctance on the part of the President to grasp the importance which the pollution of the drinking water bears to the public health of Rangoon. The casual manner in which the pollution due to house drainage and to the manuring of grass plots is referred to augurs badly for its immediate rectification. We hope, however, that better councils will prevail, and that the Health Officer will be able to persuade the Municipality to introduce notification of disease, abolish trenching and provide a pure water-supply. For, until then, there is no safety for Rangoon.

REPORT ON THE SANITARY ADMINISTRATION OF THE PUNJAB FOR 1896.

IN the Annual Report on the Sanitary Administration of the Punjab for 1896, Surgeon-Lieutenant-Colonel W. A. Roe, the Sanitary Commissioner, touches on two interesting points connected with the prevalence of cholera in India. The first is the general spread of cholera by human intercourse, the second is the checking of local outbreaks by disinfection of wells.

Dr. Roe illustrates the former by a description of the events which happened after the Nurpur fair, where the disease broke out badly at the time of the gathering of pilgrims. Enquiries by Dr. Bamber were unsuccessful in eliciting any information as to the manner in which the disease was introduced into the fair, although it was suspected that a sweetmeat seller, who was one of the first attacked, spread the disease. Whatever may have been its mode of introduction

at the fair, the disease, by the dispersion of the pilgrims, seems to have spread rapidly all over the district of Rawalpindi and the neighbouring one of Peshawar. In this last-named city one case occurred on the 15th of May, seven cases on the 16th, and six cases on the 17th, the Civil Surgeon, Surgeon-Lieutenant-Colonel Doyle, stating that all of them had just returned from the Nurpur fair, where they had contracted the disease. Beginning from May the disease caused 1,245 deaths in this month, 1,206 in June, 1,037 in July, 845 in August, 547 in September, 231 in October, 33 in November, and 1 in December, after which it disappeared. The district of Rawalpindi was most severely visited. Dr. Roe remarks that there is, in this instance, not much room for doubt about the disease having spread by means of human intercourse from the Nurpur fair, as both the Civil Surgeons of Rawalpindi and Peshawar distinctly state that all the first cases in these towns contracted the disease at the fair and developed it immediately after coming from it. Up to the 12th of May, when cholera broke out at Nurpur, Rawalpindi and Peshawar were absolutely free from it, and had been so for months previously, as well as all the Northern districts: the only cases known to have occurred in the Province being a few in the Gurgaon, Karnal and Rohtak districts situated at the other end of the Punjab. On the 9th of April, Dr. Roe visited Nurpur in company with Surgeon-Major Bamber, their object being to consider what measures should be taken in anticipation of the approaching fair. The conditions at the time were not favourable for the holding of a fair. The mountain stream, which usually supplies the place with drinking-water, had failed to a considerable extent on account of the dry weather, and the water which was usually a running stream was more or less lying in pools. With circumstances, such as these, over which there was practically no control, combined with the habits and customs of the people at wells and water courses, the views of the Sanitary Commissioner can hardly be gainsaid that, given a single case of cholera among one of the pilgrims, the epidemic at the fair resolved itself into one of water poisoning in a wholesale manner. From Nurpur then, as a focus, it appears, according to Dr. Roe, "the people scattered and spread the disease in the district immediately around, principally in Rawalpindi city, eight or nine miles

away; at Baracac, which is four; in many other thanas at short distances; and up to Peshawar which is only eight hours by rail, and from whence a good many pilgrims journey yearly to this religious place of assemblage. From this time onward the disease continued to spread more or less through the northern districts of the Province; while those in the south seem to have been slowly invaded from Gurgaon; but the disease at no time assumed the proportions it did in Rawalpindi in any other of the districts attacked. It would appear, therefore, that although introduced into many localities, the conditions favourable to the growth and virulence of the micro-organism were wanting in most places, as it did not generally assume the terribly destroying features which characterized the fatal epidemic of 1892.

In this epidemic the disinfection of wells by means of lime, alum, and permanganate of potassium was extensively resorted to, and Dr. Roe, quoting the opinion of the Civil Surgeon of Rawalpindi on the efficacy of the measures, states that "disinfection of watersupply sources by permanganate of potassium and quick lime, wherever properly carried out, was almost everywhere followed by the disappearance of the disease within a week of the application of the disinfectants." In this opinion the Civil Surgeon is supported by the Deputy Commissioner, who writes that "from the experience gained during this epidemic, I am convinced that the plan of disinfecting sources of watersupply in infected villages, by means of quick lime and permanganate of potassium is, perhaps, the best that can be devised and is of immediate benefit. It is perhaps difficult to prove from statistics, but the accumulated experiences of numerous villages warrants the conclusion that disinfection, when thoroughly carried out, tends to put an effectual stop to the occurrence of new cases."

Similar evidence of the effect, which disinfection of the wells has on the checking of the spread of an outbreak of cholera, is given by Surgeon-Captain R. Heard, Civil Surgeon, Mandan. An interesting case is also reported by Surgeon-Major Mulroney from Amritsar, in which alum was the substance used for disinfecting. Surgeon-Major Mulroney traced the introduction of cholera into the village to a weaver by trade, who returned to his village on the evening of the 7th of June and died on the 11th. The

disease was confined to the part of the village inhabited by weavers, who got their drinking water from a well in their own quarters. The relatives of the man who returned sick brought him fresh water from the well each time he asked for it, in a vessel which was constantly kept close to his bed on the ground where he was vomiting and purging, the vessel thus became tainted and through it the well was infected. The patient died on the 11th June. On the 12th June, there were 3 fresh cases; on the 13th there were 45; and on the 14th there were 8 cases, after which the disease stopped. On the night of the 12th, a large quantity of powdered alum was poured into the well and was closed for a short time, and, as there was no new seizures after the 14th, it was evident that it was the water of the polluted well which caused the outbreak in which 58 cases and 38 deaths occurred.

In this issue of the *Gazette* we publish Dr. Thornhill's paper on the disinfection of village wells in epidemics of dysentery and diarrhoea; which adds further evidence to that already accumulated on the important part which the disinfection of wells plays in the checking of water-borne diseases.

THE HEALTH OF PRISONERS.

THE sick and death-rate amongst prisoners in Indian jails is a subject which frequently gives rise to much adverse criticism amongst a certain section of politicians and jail reformers at home, who, through ignorance of the conditions under which Indian prisoners live previous to, and their physique on admission into jail, etc., are ever ready to attribute excessive sickness and mortality to some defect or other in the jail itself or its administration. The vital statistics of the present day (excepting epidemic years) compare favourably with those of past years—a result which, in our opinion, must be ascribed for the most part to the increased attention given to sanitary regulations in the matter of accommodation, ventilation, water-supply, food, clothing, the disposal of the excreta of both the healthy and sick, and the precautionary measures adopted to check the dissemination of infectious and contagious epidemic diseases. We would not for a moment say that the sanitary arrangements are perfect, but that they have undergone considerable improvement within recent years is

undeniable. Despite all this, however, there remain factors conducing to unhealthiness, over which superintendents and medical officers can exercise no control whatever, *viz.*, the widespread prevalence of malaria and its concomitants, the habits and customs of prisoners before admission, the extreme variation of climatic conditions at different seasons of the year and even at different hours of the same day,—diseases acquired during transfer, from one jail to another, and the effect of the change from a home life, however humble, to that of a solitary existence, which is perhaps more felt, even by the most despicable native criminal than by prisoners in English jails.

Moreover, the native of India, as a rule, dislikes hard labour intensely, and, while in jail, practises all kinds of deceptions and malingerings with a view to being sent to hospital, and may be safely entrusted by some device or other to raise his temperature to hyperpyrexia at a moment's notice, or by the consumption of unhusked rice, green fruit, raw vegetables or other objectionable material produce such an attack of dysentery or diarrhoea as will almost defy the best attempts of the medical officer to effect a cure.

When everything is said and done, we venture to believe that the death-rate in Indian jails might be still further reduced by the employment of a well-trained nursing establishment, and, if the suggestion is at all practicable, it seems desirable that something should be done in this direction. The provision of wards for prisoners admitted into jails in a moribund condition and a hospital to be specially set apart for those suffering from incurable diseases is, we think, deserving of consideration. The medical officer who hopes to suppress *in toto* factors conducing to unhealthiness amongst Indian prisoners, has his task before him.

Medical News.

DONALDSON'S HYGIENIC LATRINES FOR NATIVES OF INDIA.

WE understand that the President of the Building Commission, the Hon'ble Mr. Justice Trevelyan, has asked Mr. Donaldson, Superintendent of the Presidency Jail, to write a note explanatory of his sanitary inventions. This was called for because of the strongly favourable opinion expressed in the papers circulated by

the Calcutta Building Commission by the numerous medical officers who have had an opportunity of seeing these latrines in actual work, both in the mofussil and in Calcutta.

These hygienic latrines are coming into extensive use in the mofussil municipalities due to the recommendation of Surgeon-Major Dyson, the Sanitary Commissioner of Bengal, who very early recognised their merits, both from a sanitary point of view and reasonableness of price. Their introduction, although primarily due to Dr. Dyson, has been very cordially seconded by the Civil Surgeons who take an interest in the sanitation of their stations and districts.

Those conversant with the latrine arrangements of India know that the usual method is to provide a squatting platform so arranged that both liquids and solids are received into one utensil. This is the prevailing type in nearly all large towns, railway stations, cantonments, and large institutions, industrial and otherwise, all over India. The utensil is commonly an earthenware *gumlah* or a galvanized pail into which everything is received, and is consequently soon filled to overflowing principally with liquid, and there is thus a great amount of splashing which the native user naturally dislikes, and he soon learns to squat anywhere but over the utensil. The result is an abominable mess in and about the privy, not confined to the platforms alone, but extending also to the passage-ways, and producing a most offensive nuisance.

Mr. Donaldson's designs successfully separate the solids from the liquids, which seems a very simple matter, but has previously perplexed every one who has had to do with this particular branch of Indian sanitation. His oriental latrine overcomes all the difficulties to be encountered, and provides a latrine which is adapted to the habits of the people of the East, and is at the same time sanitary and clean.

PRESIDENCY GENERAL HOSPITAL.

THE report of the Committee for enquiring into the administration of the Presidency General Hospital in Calcutta is to be expected shortly, and we trust that any improvements which they may recommend will be accepted by the Government. The defects, which were pointed out by Drs. Crombie and Cobb, have now been thoroughly gone into by the two committees appointed by Government. The Building Committee submitted recommendations for the entire reconstruction of the hospital, which was approved of, with some slight modifications, by the Local Government, and land has been acquired and steps taken to commence building operations at an early date. Such radical reforms must take time for their completion and cannot be introduced hurriedly into an institution which must carry on the ordinary daily work of treat-

ing the sick. The present strain on the medical department adds to the difficulties of the administration of the hospital, inasmuch as the subordinate staff is below its ordinary strength which, as we pointed out in a former issue, was not sufficient for the duties which have to be performed in this large hospital. As the Government have shown such a willing disposition to meet the requirements of the hospital, we think the public should exercise a little patience and not be carried away by every idle rumour, but should suspend their judgment until the intentions of Government have been published.

ENTERIC FEVER IN SHILLONG.

AMONG the unfortunate troubles which followed the severe earthquake of the 12th June last at Shillong, was a smart outbreak of enteric fever which attacked the younger members of the station. Some of those attacked had left Shillong before the disease showed itself and were treated in other places. It is a curious incident that in regard to most of these cases, which have come under careful observation, the attacks appear to have occurred simultaneously and have run a concurrent course. This phenomenon is explained by the fact that the earthquake damaged the waterworks at Shillong and the people were obliged to have recourse to water from impure sources. This is one more illustration of the dependence of enteric fever on the drinking of polluted water, and it further opens up the question as to the widespread distribution of the typhoid bacillus.

DR. SIMPSON'S VIEWS ON RAILWAY QUARANTINE AGAINST THE SPREAD OF PLAGUE.

IN his annual report, the Health Officer of Calcutta gives the following reasons for having advocated railway quarantine to protect Calcutta from plague:—

"Former experience showed that, as a rule, epidemic diseases prevailing in Bombay soon found their way into the Marwari quarters of Burra Bazar, which in the native designation includes a portion of Jorabagan. Attention was therefore focussed to this quarter as well as to those quarters occupied by the Dusasrimat Baniyas, the Soratheas, Modhis, Memons, Khojas, Surates, Boras, Kharwas and Khalasis.

"As the disease increased in severity in Bombay recommendations were made by me for more stringent and adequate precautions on the lines of railway, and on a scale commensurate with the gravity of the danger. I went so far as to propose that all passengers, except first-class passengers, whose destination can easily be traced, should undergo detention for seven days before being allowed to enter Bengal. My reasons for advocating a measure like this to

protect Calcutta, though I am a strong opponent of any form of quarantine in general, are that the conditions—medical, sanitary and social—are quite different here from what they are in Europe. If we take England, for instance, she has the most complete sanitary organization in the world. Every seaport, inland town and country district has its sanitary officials with disinfecting appliances and its infectious or isolation hospital. Every death that occurs has to be certified by the attending medical officer before the corpse is buried, and if there has been no medical attendant, there is a Coroner's inquest to determine the cause of death; accordingly, any epidemic disease is at once recognised and can be dealt with immediately. There is a system of notification of cases of sickness of infectious diseases by the medical attendant to the health authorities and very often by the householder as well. The sanitary condition of England, as regards water-supply, drainage, etc., is far in advance of other countries. While its insular position permits of the careful inspection of all passengers from an infected port, and its organization allows of every passenger after inspection being watched on arrival at his town or village, and the system of notification and medical attendance allow the health authorities to obtain the earliest information so as to take the necessary precautionary steps.

"If this state of preparedness be compared with the existing condition of affairs in India, the reason for putting in force in India what is unnecessary in Europe will become obvious. In India the sanitary organization, except for the army, is extremely inadequate. There are only a few towns that possess any sanitary officials, and there are very few indeed with disinfecting appliances or with an organization for the detection and isolations of infectious diseases. Even in Calcutta, the seat of the Imperial and Local Government, over 60 per cent. of the deaths occur without the deceased having been attended by a qualified medical man, and hence extremely few of the deaths are even certified by a medical practitioner; hence from the death statistics it can only be an accidental or exceptional event to discover the early warnings of an epidemic or the true cause of death. Accordingly, the chances of recognising and dealing effectually with an epidemic in an early stage are infinitely smaller than in localities where death registration is good. Moreover, with such a large proportion of the population unattended by medical men the value of notification even when enforced is small. Combine this with the fact that the sanitary condition of the towns in India and England will not bear comparison. Every village and town in India possesses plenty of material for the spread of plague—once it is imported—and the climatic conditions are favourable. With the period of incubation of plague, varying between 2 and 9 days, an individual starting from

Bombay and infected the same day as that of departure might pass all the inspections, arrive in Calcutta on the third day, and be in the town several days before taking ill. If he were a Marwari or Marwari servant he would be living in the worst and most crowded quarter of the town. Probably no doctor would be sent for and on death occurring, the cause would be attributed to fever or to any other common cause and nothing would be heard of the case. In this way the disease would likely spread and gain a foothold before the authorities were aware of its existence. Different conditions frequently demand different modes of procedure, and it is quite possible for a sanitarian to hold with consistency diametrically opposite views in relation to detention and observation camps according to whether he is dealing with Europe or with Asia. With plague infected localities at a distance of 2 or 3 days' railway journey, the safety of Calcutta lies mainly in the exclusion of infected passengers and things. Passengers are doubtless inconvenienced and commerce slightly affected by stringent and thorough measures of detention and disinfection, yet the danger is great and justifies the means. For, if plague should be allowed to gain a foothold in Calcutta, the conditions are such as to cause a great mortality and at the same time ruin for a time, at least, the commerce of Calcutta, and of this part of India. The grumblers, at the strictness with which the rules are enforced at Khana Junction, do not realise what laxity might mean. From my point of view the precautionary measures on the railways are not strict enough."

THE RECRUDESCENCE OF PLAGUE.

MORE BARRIERS FOR BENGAL.

MR. W. PARSONS, Secretary, Bengal Chamber of Commerce, has addressed the following important letter to the Secretary, Government of Bengal, Municipal Department:—

"SIR,—The Committee of the Chamber notice that the plague is still prevalent in Bombay, and in other parts of the Bombay Presidency. It was at this time last year that the death-rate in Bombay was abnormally high, and a few weeks later plague was officially declared to have attacked Bombay. The disease unfortunately made very rapid strides on the other side of India throughout the winter and spring, and it is to be feared that it may extend this cold weather over a larger area.

"While the plague was raging in Bombay and Karachi, Russia prohibited the import of Indian tea into Batoum from Calcutta, and followed this prohibition by an order prohibiting the import of all Indian merchandise from all Indian ports into Russia, a communication which this Chamber received with considerable alarm. The steps which the Russian Government took in this

matter were prompted, the Committee believe, by the idea which is prevalent in that country, that the Government of India did not take sufficiently drastic measures to confine the plague within a certain area in the first instance. If the other nations of Europe were to follow the example set them last year by Russia, and this year prohibit the import of all Indian produce from all ports, the results to the export trade of Bengal would be disastrous.

"With this contingency in view, it is most desirable, from a commercial point of view, that every possible precaution should be taken by Government to keep the plague out of Bengal.

"Apart altogether from the distress and loss of life which would result were the plague unfortunately to gain a footing in Calcutta, the loss in such an event to the Banking and Mercantile interests would be enormous. It is hardly necessary for the Committee to touch upon the disaster which would follow, on Calcutta being closed as an export port, to the agricultural, planting, and manufacturing industries of Bengal and Assam, and finally to the Government itself, owing, for example, to the inability of the growers of produce to pay land revenue if there were no market for their produce.

"While the Committee feel sure that the authorities are fully alive to the consequences of presence of the plague in Calcutta, they would like to assure Government that any further steps which can be taken to materially reduce the probability of the plague reaching this Presidency, will meet with the entire approval of the mercantile community. The arrangements which were made last year at Khana junction were most complete, and the staff there are deserving of the highest praise for the very effective manner in which they cheerfully performed their most irksome duties. The Committee believe that Khana was probably the most perfect observation camp in India, and, in the interests of Bengal and Assam, would suggest that two similar camps should be formed, one at some station on the Bengal-Nagpur Railway, and one at some station on the East Indian Railway, considerably further west than Khana, as far away from the Bengal Presidency as possible, and this without the precautions at Khana being in any way relaxed. The larger the area to be protected, the more difficult it is to take precautionary measures, and the Committee cannot urge too strongly on Government, the advisability of making further strenuous efforts to minimise the chances of the plague gaining a footing in this large city.

"In connection with this important matter, the Committee understand that the Government of India have recently withdrawn from Bengal, for special duty, eight commissioned Medical Officers (of whom the Resident Surgeon at the Eden Hospital is one, and the Second Resident Surgeon at the Presidency General Hospital is another),

and also three Military Assistant Surgeons. The result, so far as these hospitals are concerned, apparently is that the Eden Hospital is left in charge of Military Assistant Surgeons, and that the Senior Resident Surgeon at the Presidency General Hospital is now responsible for the whole hospital work, day and night, assisted only by Military Assistant Surgeons, besides being in Medical charge of the Lunatic Asylum and the Jail. So far as the Committee can ascertain, the strength of the Medical Service in Bengal has now been weakened to the extent of eighteen officers owing to retirement, deaths, furlough, sick leave, and officers withdrawn for special duty, and the Committee cannot but consider this to be a most undesirable position in view of the recrudescence of the plague which has been alluded to in this letter.—I have the honor to be, Sir, your most obedient servant, W. PARSONS, *Secretary*."

LONDON LETTER.

BERI-BERI has broken out again in the Richmond Lunatic Asylum, near Dublin. One hundred and twenty-four cases have occurred since the beginning of June—90 female patients, 3 nurses and 30 male patients. The disease first made its appearance in the institution in the year 1894, and has continued to prevail at intervals up to the present time. The authorities are greatly exercised regarding it. The question of origin is shrouded in dense darkness, and will probably never be solved. The asylum is damp and overcrowded; but this does not account for the appearance of so specific a malady. Once introduced, the conditions—feeble resistance, humidity and crowding—are eminently favourable to its maintenance and spread; but it is impossible to admit the spontaneous generation of a tropical disease in an institution situated in a temperate climate. Cases of beri-beri are continually being imported into our large seaports, but no extension of the disease has ever been known to take place in London, Liverpool, or Glasgow. It is true that personal communication plays a very small part in its dissemination, and that it is a localised distemper flourishing in unhealthy places inhabited by dense communities; such as crowded jails and stuffy forecables. Still these facts do not render much assistance in explaining its entry into this asylum. The alternate prevalence and latency which have been observed are of seasonal causation, warmth being evidently a necessary element of vitality and propagation of the micro-organism to which the disease is due. The precise microbe which causes beri-beri is a matter of some uncertainty. Different observers have described several different forms; but there is good reason for the belief that the micro-organism of Pekelharing and Winkler is the veritable *causa causans* of the disease. At

any rate there can be no manner of doubt that very radical measures are necessary in order to extirpate the malady from the Richmond Asylum. The abandonment of the building and the erection of a new one on a drier site would probably be the best course; but the temporary removal of the patients and reconstruction of the Asylum on a larger scale and with all possible sanitary improvements seems to be imperative.

The bacteriology of yellow fever is exciting some interest at present. Not long ago the announcement was made that the specific bacillus of the disease had been discovered by Dr. Sanarelli. Now a competitor has appeared in the field, and Dr. W. Hanelberg of Rio-de-Janeiro has described an organism differing from that of Sanarelli in many important particulars, which he considers to be the true cause of yellow fever. Which of the two will finally establish its claim will depend on further investigation. But these sudden upsets are very disconcerting. To expect finality in the vital sciences is, of course, out of the question; but of all vital sciences bacteriology seems to be the most unsettled. A position is laid down one day which presents every appearance of stability; but the storms and floods of criticism and fresh discovery beat against it next day, and show by its quick demolition that it was founded on the sand. Witness the uncertainty that prevails regarding the causation of cholera and typhoid fever, and the shifts to which the supporters of Koch's vibrio and Eberth's bacillus are put to square their hypothesis with inconvenient facts. Nothing seemed more secure a short time ago than the truth and practical value of Vidal's sero-diagnosis of typhoid, and yet we have Kanthack declaring in the last issue of the *British Medical Journal* that he obtained a typical positive reaction with serum from a patient in whose body after death no lesion of enteric was found. It is hard to be in a state of continual provisional belief in regard to these matters; but it would be still more painful to inhabit a fool's paradise and find the palatial building every now and then tumbling down and leaving one stunned, startled and homeless. After all, doubting has its advantages and pleasures and after fully discounting the uncertainties of bacteriology there still remains a grand residue of established facts for which we are bound to be very grateful.

I had the pleasure of attending the prize-giving at Netley on Friday last. The function was presided over by Major-General Sir William Butler, K. C. B., commanding the South-Eastern (Dover) Division, who discharged the duty with grace and ability. The mess gave a dinner to Dr. Cayley on the 29th on the occasion of his vacating the chair of Military Medicine. The competition for admission into the medical services is going on at present. I hear that

there are 37 applicants for 18 vacancies in the Indian Medical Service and 27 competitors (!) for 30 declared vacancies in the Army Medical Staff. The latter service does not gain in popularity notwithstanding the redress of several grievances, and it is becoming apparent that the service must be rendered more attractive if it is to retain its prestige and efficiency.

I am sorry to observe that the Calcutta Medical Society is in a state of dormancy. It has now attained an age which ought to be a guarantee of permanence and there should in Calcutta be no lack of men and materials, nor of ability and ardour to secure its perpetuity and success. It only wants a very moderate measure of interest and industry to make a thing of this sort work. It possesses the great advantage of being associated in practice if not in constitution with a great hospital and school, the officers of which must always have something under observation worth drawing attention to; and the *alumni*—the past students and officials of both,—cannot but derive pleasure and profit from revisiting their *alma mater*, renewing their acquaintance with their former haunts and studying the changes in doctrine and method which new years and men are constantly producing. I cannot get myself to believe that there is such a lack of desire to teach and learn and of devotion to the most interesting of all professions and occupations in Calcutta as to permit an institution, which has done good work in the past, to die of inanition. I do hope, therefore, that with the commencement of a new session, the Calcutta Medical Society will have started a new era of activity and usefulness.

The 5th August 1897.

Transactions of Medical Society.

CALCUTTA MEDICAL SOCIETY.

THE usual monthly meeting was held on Wednesday, the 14th July 1897, at 6 P.M., in the Medical College Hospital.

Dr. B. C. SEN occupied the chair.

Dr. KEDARNATH DAS showed a *post-mortem* specimen of a case of imperforate rectum in which inguinal colotomy was performed in the Eden Hospital by Dr. Stevens. The child died about a week after the operation. The blind end of the rectum was seen about an inch and three-quarters from the cutaneous surface. The colotomy wound quite healed. Dr. Kedarnath Das then read a paper on: "Is perforation justifiable in delay of delivery of the after-coming head," which is published in another part of the Journal.

Dr. D. N. ROY congratulated the author of the paper for his success in resuscitating both the children.

MISS BAUMLER, M.D., said that in the Paris Maternity, Prof. Pinard always tries to deliver children un mutilated if possible. He then goes on with the methods of resuscitation for a long time in apparently dead children, and thus saves the life of some of them.

The President thanked Dr. Das for bringing before the Society such an interesting and practical paper.

The August meeting of the Society had to be postponed, as a quorum could not be had owing to the inclemency of the weather.

Current Medical Literature.

MEDICINE.

QUARANTINE *versus* MEDICAL INSPECTION. (BY T. BORTHWICK, M.D. *Australasian Medical Gazette*).—Dr. Borthwick strongly endorses the views of Dr. Collingridge, as given in his Milroy Lectures, in favour of medical inspection and against quarantine.

All forms of quarantine,—absolute, modified, rational or limited—have failed because they are based on a theory that is no longer tenable. To evade stringent quarantine regulations, there is an undoubted tendency to conceal the existence of epidemic disease both in an infected port and on boardship. The same applies to cargo, so that quarantine becomes impracticable in a commercial country.

Sir John Simon has stigmatised quarantine as “an elaborate system of leakiness.” To maintain this imperfect or leaky system enormous expense is required, and a false feeling of security is engendered.

Dr. Borthwick adduces instances to show that seven cases of small-pox occasioned an outlay of nearly £2,000 to Australia. He also maintains that the expenses incurred by shipping companies, when spread over various colonies, amount generally to between £2,000 and £3,000 for each vessel quarantined.

He sums up the objections to quarantine thus:—“(1) Its futility; (2) its harassing effect on trade; (3) its expense; (4) its danger to the health of detained healthy persons; and (5) its harmful effect on the sanitary condition of the country.

“On the other hand, medical inspection is effective, does not hamper trade, incurs no unnecessary expense, does not endanger health by detention, and has a beneficial result on the sanitary condition of the country. It differs essentially from quarantine in estimating the danger and the necessary precautions according to the state of health of the vessel and its inhabitants, rather than according to the health of the port from which the vessel sailed.

* * * * *

“Collingridge contends that medical inspection should imply visits by the medical officer of health to every vessel from foreign ports, with examination of any case of sickness (whatever its nature) on board, and, if from an infected port, examination of every person on board as well. The system, further, at once isolates the sick, allows the healthy passengers to go free after taking their names and destinations, and detains the ship only long enough to permit of the necessary disinfection. There are thus two lines of defence:—(1) Medical inspection at the port; and, should this fail, (2) the sanitary

organization of the country generally. The health authorities of the districts to which the liberated passengers are bound are notified of the names and addresses, so that each person can be kept under observation for a given period, if required. In fact, a ship is treated as if it were a house on shore, and reliance is placed on inspection, compulsory notification, isolation, disinfection, and general sanitary measures.”

AN EXAMPLE OF QUARANTINE BEFORE THE LATE VENICE CONFERENCE.—In the *Practitioner* for July a late ship's Surgeon writes an amusing account of what he and his fellow-passengers on board a well-known steamer, sailing from Bombay to Marseilles early in 1897, suffered at the hands of various quarantine officials at Aden, Suez, Port Said, and Marseilles.

“It has been difficult to convey in words all the disadvantages of quarantine, the waiting about, anxiety, incentives to dishonesty, chances of infection, the commercial and domestic troubles ensuing; but they have only to be experienced to be felt. The abuses are very great; but were quarantine necessary, all could be forgiven. Quarantine, besides being useless, even *de rigueur*, is even dangerous, for the reasons suggested above: for the chance of saving a city at the cost of a ship, which is perhaps quite logical, but suitable to the days of Socrates or Cato, trade is to be lost and workmen are to starve.”

THE CAUSATION AND RHYTHM OF THE “PRESYSTOLIC” MURMUR. (BY E. M. BROCKBANK, M.D. *The Medical Chronicle*).—For long there have been two theories concerning the etiology of the presystolic murmur, especially as regards its characteristic crescendo of heightened intensity towards its close. The older and perhaps more popular theory, supported by Fauvel, Gairdner and Sansom, ascribe the murmur to the friction caused by blood being forced through a stenosed mitral orifice by auricular systole aided by the aspirating force of the ventricle in diastole.

The other theory, supported by Ormrod, Barclay, Turner, and Dickinson, inclines to the view that it is a ventricular regurgitant murmur, *i.e.*, it is caused by the blood regurgitating through the stiffened rim and cusps of the mitral valve before sufficient force is generated in the ventricle to close the valve. Dr. Brockbank applies himself chiefly to explaining “the crescendo murmur of ascending pitch,” and his explanation is applicable to either theory of the bruit; but he favours “the acceptance of an early ventricular systolic rhythm of the presystolic bruit.”

“What I believe to be the true causation of the murmur in question is that the crescendo and ascending pitch characters of the bruit—but especially that of ascending pitch—are developed by blood rushing through a gradually

but rapidly *diminishing stiff-rimmed, narrowed mitral valve* under a pressure which probably increases progressively with the duration of the murmur."

PRACTICAL CONCLUSIONS DERIVED FROM A STUDY OF FIVE HUNDRED CASES OF CARDIAC DISEASE. (By J. K. CROOK, M.D. *The New York Medical Journal*).—In his medical clinic Dr. Crook made observations on 5,827 patients, 503 of whom suffered from disease of the heart or main vessels. Of this number 277 were functional disorders, and 226 were organic diseases.

Functional disorders in males were chiefly due to:—(1) Reflex disturbances, e.g., indigestion; (2) excessive use of tobacco, especially among youths; (3) alcoholic excess. Amongst females the functional disorders were chiefly caused by digestive disturbances, anæmia, &c. Only a minute proportion could be ascribed to excessive tea-drinking. Functional cardiac troubles predominated in the females, and organic disease preponderated amongst the males. Of the 226 organic cases there were:—Mitral regurgitation, 60; mitral stenosis, 35; aortic stenosis, 36; aortic regurgitation, 7; tricuspid regurgitation, 6; and pulmonary stenosis, 1—mixed lesions accounting for the rest.

These results are not altogether in accord with Ashton's analysis of 1,024 cases of valvular lesions. In examination for life insurance Ashton found:—Mitral regurgitation, 557; mitral stenosis, 32; aortic stenosis, 136; aortic regurgitation, 47.

Dr. Crook found aortic regurgitation to be the most fatal, and suddenly fatal, owing to want of stable compensation. In these cases there was extensive cardiac hypertrophy and dilatation.

Aortic stenosis was fairly common, and was usually tolerated for a long time. There is, however, a liability to sudden death from over-distention of the left ventricle.

Mitral regurgitation was the most frequent and most hopeful of all the valvular lesions, and it was the most tractable in the event of complications.

Mitral stenosis was often borne for many years; but there was a tendency to a fatal result from intercurrent attacks of bronchitis or pneumonia.

Dr. Crook noticed that his cases of tricuspid regurgitation were mostly secondary to pulmonary emphysema.

CANCER OF THE STOMACH IN EARLY LIFE. (By GEORGE DOCK, M.D. *The American Journal of the Medical Sciences*).—Dr. Dock describes in detail a case of gastric carcinoma occurring in a young man, 20 years of age. He has also seen the disease in a woman, 24 years of age. A point to be noted is that cancer of the stomach in early life often runs a slow course. Mathieu reported a fatal case in a man aged 25

years, in whom the symptoms commenced three years previously.

CANCER OF THE BREAST IN A CHILD. (*Boston Medical and Surgical Journal*).—In a letter Dr. A. N. Blodgett reports a case of cancer of the breast in a boy twelve years of age.

"Soon after this time a swelling was noticed in the left breast, beneath and attached to the nipple, which was slightly reddened and harder than its fellow: the swelling and induration gradually increased in size during the succeeding months, and the skin became more extensively adherent. * * * The growth, on microscopical examination, presented the typical structure of carcinoma, and had invaded all visible glandular tissue of the breast."

On a par with this is the fatal case of cancer of the uterus in a girl 14 years of age, reported by Dr. W. L. Little in the *New Orleans Medical and Surgical Journal* for December 1896, which is quoted by Braithwaite. When Dr. Little was called in, he found the adhesions too extensive to attempt any operation, and the girl died five months later.

D. M. MOIR, M.A., M.B.

OBSTETRICS AND GYNÆCOLOGY.

SUBCUTANEOUS SYMPHYSIOTOMY (*American Journal of Obstetrics*).—Dr. Ayers gives the following directions for performing subcutaneous symphysiotomy:—

1. Secure full dilatation of cervix, if possible without risk to the child.
2. Have the urethra and bladder held to one side with a sound.
3. Make the initial incision a little above the sub-pubic arch and under the *elevated clitoris*.
4. Introduce the left index finger within the vagina against the posterior groove or ridge of the joint, up to the top.
5. Pass a narrow tenotomy knife with the point close to the joint, up to within a half inch of the top and *under* the overlying soft tissues.
6. Substitute a probe-pointed bistoury and meet the left index finger with the probe over the top of the joint and work the blade through the joint downward until separation is felt by the posterior finger.
7. Have an assistant press the mouth of the wound and the tissues lying over the joint with a small piece of gauze.
8. Deliver with forceps, if possible, and refrain from supra-pubic pressure, aiming to deliver the head through the cervix without drawing the latter down below the symphysis.
9. Hold the bladder well to one side while pressing the pubic bones together.
10. Pass a small strip of gauze into the pre-pubic wound and another against the cervix after irrigating, leaving both pieces ex-

posed for easy removal, having refrained from stitching cervix or perineum.

11. Introduce a soft rubber retention catheter into the bladder, and leave it until sure the patient can voluntarily micturate.

12. Dress the vulva with gauze and strap the joint with adhesive strips.

13. Remove all the gauze in 36 hours and irrigate vulva and vagina twice a day, keeping the vulva carefully dressed between times.

A CASE OF INTRA-PERITONEAL GESTATION AT TERM. (*American Journal of Obstetrics*).—Rosenwasser reports the following case:—Mrs. ———, *æt.* 33; married 8 years; II para, the last child born 5 years ago; no abortions. Menses regular, the last period April 23rd, 1896. She failed to "come round" in May, which so upset her plans that she consulted a "doctor" who dilated the womb on June 13th. The attempted abortion caused the loss of a few drops of blood, but was followed by no further consequences. On June 23rd she was seized with violent pain in the abdomen while lying on a sofa, fell to the floor and fainted. She had to be carried to bed, where she was confined for two weeks with supposed peritonitis. She remained weak till October. Between February 1st and 3rd she had labour pains which, however, ceased by degrees and did not return. She has never felt much motion. Since the spurious labour she has positively diminished in size. When seen on February 16th, 1897, the contour and size of the abdomen corresponded to an eight-months' gestation. The enlargement consisted of a large, smooth, round tumour filling the abdomen, except low down in the left hypogastrium, where it crowded a smaller harder tumour, felt from the point of contact above the pubes to the extreme left in the iliac fossa. Fœtal parts not made out; no fluctuation. No movements, contractions or fœtal heart sound. Cervix soft; external os admitted the end of the finger, but the internal os was dense and did not admit of dilatation by the finger. Bimanually the small tumour was recognised as the uterus. The posterior vaginal vault was slightly bulged down, convex, filled with a doughy, tender, immovable mass.

The diagnosis of ectopic pregnancy originating in the right tube and of a dead fœtus, was foreshadowed by the history and confirmed by the physical examination. It was decided to watch the patient and await indications for interference. On February 20th the woman felt chilly all day and had severe pain in the abdomen. Temperature 100.5°. Pulse 98. Operation set for 22nd. Under chloroform the sound was passed into the uterus, and it went in five inches. A median incision was made and deepened till the parietal peritoneum was reached, which was much thickened and dark in colour, not adherent

to visceral contents. The gestation sac now presented. Across the upper part of the sac, which reached nearly to the liver, lay the infolded omentum attached to the sac by recent adhesions. Upon gently loosening these the skin of the fœtus became visible through the opening in the sac that had been plugged by the omentum. The loops of intestine surrounding the opening in the sac were intensely red. The opening was extended downward by an incision through the sac wall, disclosing the somewhat macerated female fœtus which was delivered. There was not a drop of amniotic fluid either in the sac or in the abdominal cavity. The amnion formed the inner lining of the sac. The boundaries of the gestation sac were now examined. It crowded the elongated uterus far to the left. It extended from the inner border of the left broad ligament, occupied the entire right pelvis and enclosed the lower abdomen, forming a dome over the pelvic cavity. Above it was covered by adherent intestines. The lower anterior wall was formed of uterus and broad ligament. The sac wall, except where the posterior surface of the uterus and of the broad ligament complemented it, was composed of organized lymph, its thinner portions readily breaking down. The intestinal adhesions were now relieved with the intention of extirpating the entire sac. There was no difficulty until the sigmoid flexure was reached, which was so intimately connected that extirpation was abandoned. Behind and below the sac, adherent to the bottom of the recto-vaginal pouch, was a mass as large as an orange, which on enucleation proved to be an organized clot. The placenta was attached within the anterior portion of the sac, to the right margin and right posterior surface of the uterus. The detachment of the placenta was begun at the bottom of the sac and was quickly accomplished. Tufts of placental tissue and shreds of membrane were left in the sac. The hæmorrhage was not at first severe and was controlled by a firm pack of hot gauze sponges. While stitching the sac wall to the abdominal incision there was noticed a rapid bleeding through the pack. The sac was emptied and repacked, but the bleeding went furiously on. The left broad ligament and the tissues to the right of the sac were clamped. The patient was now all but pulseless, and an intravenous transfusion of eight ounces of normal saline solution was made. The left ovarian artery was now ligated. The right one could not be reached. The clamp were removed, and the edges of the sac were stitched to the parietal incision. Gauze packs were left in the gestation sac. The vagina was firmly tamponed. The patient rallied nicely from the shock. On February 24th, there were symptoms of sepsis; pulse 130 to 140; abdomen much distended; packing removed; discharge very offensive. February 25th, patient restless; pulse 144; vomited once

a dark fluid; removed shreds of membrane and small pieces of placenta; discharge from sac still very offensive. February 26th, pulse 126; abdomen still much distended, but wound not offensive. March 7th, has been steadily improving, but temperature varies from 100° to 101°. Removed a gauze sponge from the bottom of the sac that had been overlooked at the time the others were removed. From this time on convalescence was unevenful.

The foetus was twenty inches long and weighed 6½ lbs. Its surface was macerated, the epidermis peeling off in large flakes. Cranial bones loose and flabby.

It is evident that the right tube ruptured when the patient was two months' pregnant. That the rupture was intra-peritoneal is proven by the organized blood clot adherent in the recto-vaginal pouch. The uninjured ovum containing a living foetus was partly or wholly expelled from the ruptured tube, leaving the placenta in the tube. The ovum continued its development in the abdomen surrounded by exudate and blood serum. The gestation sac thus formed attachments to the blood clot anchored below and to the intestines above, while the placenta continued its growth close to the uterus. The foetal membranes and organized lymph formed the only envelope of the foetus above the pelvic brim. After the spurious labour the foetus died and the amniotic fluid was absorbed; patient herself noted her diminution of size. There was a final rupture of the upper anterior sac wall a few days before the operation, causing a localized peritonitis which gave the direct indication for interference.

AGE OF FŒTUS IN MISCARRIAGES (*Jour. d'Accouch.*).—Lambinon gives the following figures, obtained at the Liège Maternity, as a contribution to the study of the determination of the age of the foetus from the weight of the placenta in cases of miscarriage. The average weight of the placenta at 6 weeks was 20 grammes; at 90 days, 67 grammes; 120 days, 111 grammes; 165 days, 262 grammes; 235 days, 330 grammes.

AXIS OF THE FŒTAL HEAD (*Medical Review*).—W. H. Ford believes that the description of the mechanism of labour may be simplified by assuming an axis of the foetal head as a fixed quantity, and considering it in relation to the parturient canal. The axis which he describes is a curved line passing through the middle of the head lying wholly in the sagittal plane of the head and constituted by connecting the middle points of successive planes passed divergingly in a transverse direction through the skull and face from the sub-occipital region, as this point during labour becomes fixed beneath the pubic arch, from which planes are passed for the determination of the axis of the parturient canal. By comparing these axes he lays down the law that labour is

most easily and physiologically accomplished when the axis of the foetal head lies in the same plane as that of the parturient canal and is as nearly as possible synclinal with it.

KEDAR NATH DAS, M.D.

Vital Statistics & Sanitation.

THE VENICE CONVENTION OF 1897.

GENERAL RULES FOR THE PREVENTION OF THE INTRODUCTION AND SPREAD OF THE PLAGUE.

CHAPTER II.

MEASURES TO BE TAKEN OUT OF EUROPE.

SECTION IX.—*Measures to be taken with regard to ships coming from an infected port and ascending the Danube.*

Until the town of Sulina is provided with good drinking-water, ships ascending the river will be under strict supervision.

On board ships, the sale of food and drink will be strictly forbidden. Ships will be detained for medical inspection and until disinfection has been completed.

Ships arriving at Sulina must, before being permitted to ascend the Danube, undergo one or more medical inspections by day. Each morning, at a given hour, the doctor will satisfy himself as to the state of health of all persons on the boat, and will not permit it to enter the river, until he is assured that their condition is satisfactory. He will deliver, free of charge, to the captain or master, a sanitary passport, Bill of Health or certificate, the production of which will be demanded at the port of arrival.

There shall be no detention. The detention at Sulina of healthy ships will not exceed 6 days. Contaminated clothes will be disinfected on arrival.

Drinking-water of good quality will be substituted for water of questionable quality that may be on board.

The bilge-water will be disinfected. The measures above indicated will only be applied to arrivals from ports infected with the plague.

It is to be understood that a ship coming from a healthy port may, if it does not wish to submit to the restrictive measures indicated above, refuse to embark travellers from an infected port.

The rules for suspected and infected ships will be the same as at other European ports.

CHAPTER III.

INSTRUCTIONS REGARDING THE METHOD OF DISINFECTION.

1. Personal effects, rags, infected bandages, papers, and other articles without value should be destroyed by fire.

2. Under-clothing, bedding, wearing apparel, mattresses, carpets, etc., which are contaminated or suspected should be disinfected in stoves at normal pressure, or at a pressure of from one-and-a-half to two degrees, with or without the presence of steam.

Before a stove is passed as efficient for the purposes of disinfection, it should be subjected to a test, with the aid of a signal thermometer, showing the moment when the temperature in the middle of a mattress rises to at least 100 (centigrade).

To ensure that the disinfection is effective, this temperature must be maintained for from 10 to 15 minutes.

3. Disinfecting solutions—

(a.) Solution of corrosive sublimate, of 1 part in 1,000, with the addition of 10 grammes of chloride of soda.

The solution should be coloured with aniline dye or indigo. It should not be placed in metal vessels.

(b.) A 5 per cent. solution of pure crystallized carbolic acid, or 5 per cent. of crude commercial carbolic acid in a warm solution of soft soap.

(c.) Fresh slaked-lime.⁽¹⁾

(1) To get very strong slaked-lime, take lime of good quality, slake it, by moistening it gradually, with half its weight of water. When the operation is completed, put the powder in a carefully corked receptacle, and place it in a dry spot. As each kilogramme of lime absorbs 500 grains of water in order to become slack, it acquires a volume of 2 litres and it is sufficient to dilute it with double its volume of water to obtain a white-wash which will be of

4. Special instructions to be observed in the employment of disinfecting solutions.

The linen, clothing and articles soiled by the excreta of patients should be soaked in the solution of corrosive sublimate. The solution of pure carbolic acid and the solution of soap and carbolic acid are equally suited to the purpose. The articles should remain in the solution for at least six hours.

Articles which cannot be subjected to the temperature of the stove (100° centigrade) without injury, such as leather goods, wooden articles stuck together with glue, felt, velvet, silk, etc., should be washed with the solution of corrosive sublimate; coins can be disinfected with the solution of soap and carbolic acid.

Persons engaged in nursing the sick should wash their hands and faces with the solution of corrosive sublimate, or with one of the carbolic solutions.

The carbolic solutions will be useful, more particularly for disinfecting articles, such as metals, instruments, etc., which can neither be subjected to a temperature of 100° centigrade, nor placed in contact with corrosive sublimate.

Slaked-lime is particularly recommended for disinfecting excreta. Expectorated matter should be burnt.

5. Disinfection of ships with plague patients on board.

The cabin or cabins, and all parts of the ship occupied by the sick or suspected, should be cleared out and all articles in them should be treated as described above.

The partitions should be disinfected with the solution of corrosive sublimate with an addition of 10 per cent. of alcohol. The washing should commence from the top, horizontally, and be continued downwards, so that the whole surface of the partition becomes covered with a coating of minute drops.

The boarding should be washed with the same solution.

Two hours after, the walls and flooring should be washed over with plenty of water.

6. Disinfection of the hold of an infected ship.

To disinfect the hold, sulphate of iron, in quantity sufficient to neutralize the sulphuretted hydrogen, should first be thrown in, the bilge-water should be pumped out, and the hold washed with sea-water. Solution of corrosive sublimate should be thrown in.

The bilge-water should not be pumped out while the ship is in port.

CHAPTER IV.

PRECAUTIONARY MEASURES RECOMMENDED FOR SHIPS ON DEPARTURE, DURING THE VOYAGE, AND ON ARRIVAL.

Note.—Plague appears to be transmitted by the excretions of the sick (from the air passages and bowels), by the morbid products of the disease (pus), and consequently by means of linen, clothing and soiled hands.

I.—MEASURES TO BE TAKEN ON DEPARTURE.

1. The captain should be careful not to embark persons suspected to be suffering from plague. He should refuse to receive on board dirty or suspicious linen, personal effects, and bedding, and, generally, all dirty or suspicious articles.

Bedding, wearing apparel, personal effects, etc., belonging to persons suffering from plague should not be taken on board.

2. Before embarkation, the ship should be put in a state of perfect cleanliness and she should, if necessary, be disinfected.

3. It is essential that the drinking-water taken on board should be obtained from a source free from all possible contamination.

Water is not dangerous if it is distilled or boiled.

II.—MEASURES TO BE TAKEN DURING THE VOYAGE.

1. Every ship should have a special place reserved for the segregation of persons attacked by contagious disease.

2. If there is no such place on board, the cabin or other place, in which a person is attacked with plague, should be isolated.

Only those attending the patients should be admitted. Such attendants should be cut off from all contact with the other persons on board.

3. The bedding, linen, and clothing which have been in contact with the patient should immediately, and in the patients' room, be soaked in a disinfecting solution.

The same measure should be taken in the case of the clothing of the persons who have access to the patient which may have become polluted.

Articles which are of no value should be burnt, or thrown overboard, if the ship is not in port or in a Canal. Other articles should be carried to the stove, in impermeable bags, sprinkled with a solution of corrosive sublimate, so as to avoid all contact with surrounding objects.

If there is not a stove on board, the articles should be soaked in the disinfecting solution for 6 hours.

2. The excreta of the sick should be collected in vessels, into which a glass of the disinfecting solution above described has been previously poured.

3. The vessels should be at once emptied into the latrines, which should be disinfected each time.

4. The places occupied by the sick should be carefully disinfected according to the rules previously laid down.

5. Corpses should be wrapped in a shroud impregnated with corrosive sublimate and thrown into the sea.

6. All the preventive measures taken during the voyage should be stated in the log, which should be submitted to the sanitary authority immediately on arrival in port.

7. The measures should be applied to everything that has been in contact with the sick, irrespective of the gravity and result of the illness.

III.—MEASURES TO BE TAKEN ON ARRIVAL.

1. If the ship is infected, the persons attacked should be disembarked and segregated in a place set apart for the purpose.

Those who have had access to the sick should be considered as suspected.

2. All contaminated objects and articles, such as clothes, bedding, mattresses, carpets, and other articles which have been in contact with the sick, the clothes of those who have been in attendance on them, the articles in the patients' cabin, and in any cabin and on the deck, or parts of the deck where the sick have been placed, should be disinfected.

(Concluded from page 318.)

A SHORT REPORT ON THE PLAGUE IN BOMBAY AND THE MEASURES TAKEN TO SUPPRESS IT.

THIS report is not an exhaustive history of the plague in Bombay or elsewhere. It is simply a narration of such facts as were observed and such information as could be collected by the authors during their stay in Bombay from 16th May to 10th June, together with certain recommendations made, with all due deference, as a result of their observation.

PLAGUE IN BOMBAY.

1. *Date of commencement.*—The first recorded case of plague was noted on 13th August 1896. The fact of its presence in the city was brought prominently before the public by Dr. Viegas during the second week of September. At first the cases were few in number, and it was not until December that the disease assumed a virulent epidemic character and spread throughout the city. The disease although checked, still runs its course at the present time.

History shows that on first breaking out in any district the disease has never been recognised, and Bombay forms no exception to this rule. This is due partly to the difficulty of diagnosis, but mainly to the reluctance to admit an unpleasant fact, which must have most injurious effect on the trade and prosperity of the community. Hence the diagnosis is kept in abeyance until there cannot be the slightest doubt as to the name which must be given to the disease. Unfortunately by this time the opportunity of limiting its spread and of stamping it out has passed, and the resulting epidemic with all its attendant horrors has to be faced.

2. *Source.*—It would appear most probable that the disease did not originate in Bombay, but was introduced from without. Whence did it come? Unfortunately the data available are insufficient to decide this most important question. Three sources of infection are possible:—

I.—By sea from the ports of the Persian Gulf.

II.—By sea from Hong-Kong.

III.—By land from Kumaon in Northern India.

The first would appear to be the most probable supposition.

3. *Quarter first affected.*—The first cases, so far as is known, occurred in Mandvi, near the Docks, the great centre of the import trade in Bombay.

4. *People first attacked.*—The people first attacked were coolies working about the Docks and persons living over the grain godowns.

5. *Spread.*—The disease spread as the inhabitants migrated from the affected quarter to other parts of the town previously healthy. As the disease increased in severity, it attacked other classes, but as usual in epidemics in other parts of the world the poor suffered most.

6. *People most affected.*—The poor and overcrowded were the chief sufferers and the poor because they were overcrowded. Dr. Weir, the Health Officer, observes:—

"The extraordinary freedom, almost immunity to date, enjoyed by the Halakhores, who clean the privies, and the sweepers who clean the streets and gullies, living in municipal buildings, is due, I believe, to the ventilation of the buildings in which they live."

We had an opportunity of examining these buildings with Dr. Weir, and are in entire accord with his opinion expressed above. The same classes living in other buildings have suffered as much as the rest of the population. Dr. Weir also alludes to a similar immunity enjoyed by the prostitutes living in different parts of the city—an immunity which he rightly ascribes to the better venti-

lation of their rooms and the less over-crowded condition in which they live compared to their immediate neighbours.

With a few exceptions, the Europeans almost entirely escaped.

7. *Total mortality*.—The total mortality from the beginning of the epidemic up to the end of April may be roughly put down at 25,500.

8. *Plague*.—We do not propose to give here a history of the true plague, which, under various names at different times and places, has been known for centuries past, from the year 98 A.D. down to the present time. It will suffice to mention the names applied to the disease in India, and the best known and most authenticated instances of its epidemic appearance in this country during the present century.

9. *Synonyms*.—The true plague—*pestis bubonica*—has been known in India as the Indian plague, Bombay plague, Pali plague and Mahamari:—

Previous epidemics in India 1800–97.

1815	...	...	Cutch.
1816	...	...	Guzrat.
1817	...	...	Sind, Hyderabad, Ahmedabad.
1821	...	...	Kumaon and Gharwal.
1823	...	...	Ditto.
1834	...	...	Ditto.
1847	...	...	Marwar, Jodhpur, Rajputana, Pali.
1836	...	...	Gharwal.
1876	...	...	Kumaon.
1884	...	...

10. *Definition*.—Plague, or bubonic fever, may be defined as a specific contagious fever, closely resembling typhus in its symptoms, but distinguishable from it by the absence of any true rash, by the development of buboes, and by the presence of a specific bacillus.

11. *Causation*.—The symptoms of plague are due to the presence in the body—lymphatic glands, blood, spleen, lungs of an inoculable micro-organism, viz. the plague bacillus. The bacillus is very sensitive to heat, light and fresh air; hence plague, like typhus, would appear to be essentially a filth disease. The micro-organism is a short, rod-like bacillus, which was discovered by Yersin and Kitasato independently in 1894. Its characteristics will be subsequently referred to.

12. *Incubation*.—From observations made at the Parel Hospital, Surgeon-Captain G. S. Thomson gives the period of incubation at from two to eight days. The average incubation period may be taken to be from 3 to 5 days. For purposes of control, the International Sanitary Conference have decided that the disease must be deemed to have an incubation period of ten days.

13. *Symptoms and progress*.—Surgeon-Captain Thomson, from his experience at the Parel Hospital, states:—

In the majority of cases brought to the Parel Hospital, the onset was sudden. There were no premonitory symptoms, the patient being often suddenly struck down whilst at work.

The first symptom noticed was often a chill or rigor, followed by fever, T102°, headache, nausea, vomiting, apparently of central origin and affording no relief, the vomited matters consisting chiefly of bile. Pains in the limbs, muscular weakness and prostration quickly followed. The pulse was rapid, weak and irregular (100–120); the respirations hurried and shallow (20–30). The tongue was usually an early indication of the disease, quickly becoming thickly covered with fur on the dorsum, whilst the tip and edges remained clear or assumed a bright red appearance. In a certain number of cases it was enlarged and appeared too big for the patient's mouth. There was a peculiar sour and earthy smell about the breath. The skin was hot, dry, non-perspiring and attended with a peculiar earthy odour, most marked in the general septicemic cases. The conjunctive were frequently injected. The bowels were constipated. As the disease progressed, the patient lay on his back taking little interest in his surroundings with a dull apathetic stupid look, eyes half opened and very seldom completely shut—in a condition of mental obtuseness. Slight deafness was often present, questions were replied to slowly, and the answers only partially given; conversation appeared laborious. Sleeplessness was complained of and delirium followed by stupor and coma rapidly supervened.

The characteristic swelling of the lymphatic glands—buboes—made appearance about the second and fifth days, most commonly on the second day, occasionally within twenty-four hours of the appearance of the initial rigor. They were commonly situated in the groins (inguinal or femoral region), axilla, neck, or in more than one of those situations.

The following table shows the situation of the buboes in 141 cases in which buboes were present treated at the Parel Hospital:—

Axilla	...	...	38 or 27%
Groin	{ Femoral	...	55 „ 39%
	{ Inguinal	...	21 „ 15%
Neck	...	...	12 „ 9%
Multiple	...	...	14 „ 10%
Total	...	...	141 100

14. In the above cases, it will be seen that buboes occurred twice as often in the groin as in the axilla.

15. Amongst 145 bubonic cases treated at the Grant Road Hospital, the following gives the situation of the buboes:—

Axilla	...	27 or 18.6%
Groin	{ Femoral	...
	{ Inguinal	...
Neck	...	0 or 0
Parotid region	...	13 „ 9%
Other situation	...	2 „ 1.4%
Multiple	...	18 „ 12.4%
Total	...	145 100.00

Here again the more frequent occurrence of the buboes in the groin is noticed, but the position as regards the femoral and inguinal regions are reversed.

Referring to the above table of the 27 axillary buboes, 19, or 70 per cent., were situated on the right and 8 or 30 per cent., on the left side. Of the 67 inguinal buboes the proportion was right 35 or 52 per cent., and left 32, or 48 per cent. Similarly, of the 18 femoral buboes, 10, or 56 per cent., occupied the right, and 8, or 34 per cent., the left side, whilst of the 13 parotid buboes, 6, or 46 per cent., were situated on the right, and 7, or 54 per cent., on the left. As regards mortality, the axilla would appear to be a more dangerous situation than the groin; thus amongst 66 axillary cases, 18 or 27 per cent., recovered, whilst out of 161 groin cases, no less than 63, or 39 per cent., recovered. Out of 32 cases of multiple buboes, 15, or 47 per cent., ended in recovery.

The buboes differed markedly in size; generally they were at first small, but rapidly enlarging reached their maximum on the eighth day, and subsequently, if the patient survived, either suppurated or resolved, the process of resolution being slow and prolonged. The number and size of the buboes afforded no indication of the severity of the case. Occasionally the buboes were the seat of intense inflammation accompanied by much surrounding cedema; these cases were generally fatal. Marked tenderness was usually present at some period of the course of the bubo, not necessarily, however, on its first appearance. Dr. Dallas states that often in a case in which a bubo cannot at first be felt, marked tenderness is present over the site of its subsequent development.

In none of the 250 cases treated at the Parel Hospital did a carbuncle occur. Thomson states: "In a few instances the entire buboes with portion of the surrounding tissue sloughed *en masse*, leaving a large cavity which, if the patient recovered, healed slowly by granulation. This sloughing was, however, invariably due to the irritation following the application of marking nut (*Semil-carpus Amcardium*) or other native medicine before the patient's admission to hospital. These cases might possibly have been mistaken for carbuncles, but their history was clear." Dr. Dallas (Grant Road Hospital) has stated that amongst three hundred cases of Plague, in only two cases were carbuncles met with.

Potechire on the surface of the body were not observed. The delirium was of a low muttering type, the patient at the worst merely trying to get out of bed. Cases of violent delirium, necessitating the patient being held down by several assistants, did, however, occur, more especially in the earlier part of the epidemic.

The urine was of a febrile type, and a slight amount of albumen was present in the majority of the cases during the febrile state, and occasionally haematuria occurred. Urine was not met with. Retention occurred in two hundred and fifty cases (Thomson).

16. *Fever*.—The temperature at the onset varied between 102°–105°, and occasionally rose higher. Fatal cases were, however, met with in which the temperature never rose above 100°. If the patient survived so long, the temperature usually fell after the 7th day, and remained subnormal for the first week of convalescence.

17. *Pulse*.—The chief characteristic of the pulse was its feebleness due to the extreme weakness of the heart's action; death from syncope was common, and occurred with startling rapidity.

At the onset of the disease constipation was present in the majority of the cases. Occasionally cases of diarrhoea were met with, and in a few instances the motions were stained with blood (Dallas).

Pregnant women, in whom the third month, recovered from which they were pregnant, attack from which they were appearing to affect the result in any way. Women advanced in pregnancy invariably aborted and died. In such cases the fetus showed hæmorrhagic petechia in the usual situation, but on

bacteriological examination no plague bacilli were found in the petechiæ.

The fact of menstruation occurring during the course of the disease was said to greatly lighten the gravity of the case and lessen the chance of recovery.

The following complications were noted: broncho-pneumonia, pneumonia, dysentery and meningitis.

Amongst sequelæ the most frequent were boils, lymphangitis, abscess, aphasia, dysentery, diarrhœa, anemia, conjunctivitis, ulcers of the cornea, panophthalmitis, dementia.

18. *Relapse*.—In a few cases, what appeared to be a relapse occurred, *viz.*, the pulse and temperature rose, the distress returned, and a fresh set of lymph glands were found to be swollen and enlarged. An examination, however, rendered it doubtful if there were true cases of relapse, as the enlarged glands were simply those of the same lymphatic chain situated somewhat nearer the main lymphatic system, and the symptoms were capable of being explained by a late sympathetic inflammation of the glands having been caused by undue exertion or too early movements of the patients.

19. *Recurrence*.—No patient who had suffered once during the present epidemic has up to date been proved to have had a recurrence of the disease. A case, however, occurred in which an European lady, who had suffered from plague in Hong-Kong again contracted the disease. The second attack ended as the first—in recovery.

As the number of observations of the various scientific Commissions increased, it became evident that at least three forms of the plague could be distinguished, possibly a fourth:—

- I. The "bubonic" form. This was the most frequent, and was characterised by great enlargement of lymphatic glands.
- II. The "septicæmic" form, characterised by the absence of any obvious enlargement of lymphatic glands and by the presence of high fever, delirium, and early collapse (German Commission).
- III. The "pneumonic" form, in which there was no obvious enlargement of the lymphatic glands, but in which the symptoms of broncho-pneumonia were present (Childe).
- IV. The "intestinal" form? Only one case of this possible form was brought to our notice, but the symptoms were so characteristically intestinal that it is possible that further observations will show that it belongs to a separate class. Briefly, the case was that of an European, whose illness began suddenly with fever—frontal headache—sleeplessness and delirium. The tongue was furred, gurgling and tenderness in the right iliac fossa were present, and several ochre-coloured diarrhœic motions were passed in the 24 hours. Tympanites set in, and the case progressed to a rapidly fatal issue. Prior to death buboes appeared in both inguinal regions.

The "Bubonic" variety has already been referred to. The "Septicæmic" variety was extremely fatal. In these cases the symptoms of an acute septic infection were present, without any obvious primary lesion. The truth of the diagnosis was proved by bacteriological examination and the discovery of the plague bacillus. Of six such cases treated at the Parel Hospital, five died.

The "Pneumonic" variety, which in the early part of the epidemic was not recognised, was also extremely fatal. Of seven such cases treated at the Parel Hospital, all died. This primary pneumonic plague of Childe must be carefully distinguished from the secondary pneumonic cases, *i.e.*, primary bubonic cases of plague, in the course of which pneumonia develops as a complication such as it may do in the course of any acute specific fever. In these cases there was the same preliminary rigor followed by fever, nausea, vomiting, headache, and pain in the limbs; but instead of a bubo developing, the symptoms of a low form of broncho-pneumonia, or bronchitis, supervened. The physical signs in the lungs were at no time well marked, whilst the prostration and general weakness were out of all proportion to the apparent extent of the mischief in the lungs. This is probably the most dangerous form of the plague known, *i. e.*, fatal to the patient and dangerous to healthy individuals. The patient's sputum is practically a virulent pure culture of the plague bacillus. The late Dr. M. died of this form of plague as did also the nurse who attended on him. Two ward boys at the Parel Hospital died of this form of the disease contracted by smoking the hookah of a plague patient. This form of plague is undoubtedly highly infectious. As regards the bubonic form, the infectivity would appear to be but slight, provided the patient is confined in a roomy and airy compartment such as a hospital. Friends were freely allowed to visit plague-stricken relatives in all the hospitals, and no evil result followed so far as could be ascertained. With a few exceptions the nurses, ward boys, and sick attendants generally escaped the disease. One of these exceptions, *viz.*, two ward boys at Parel Hospital, has already been alluded to; another exception occurred at the Grant Road Hospital. In this case also the

victim was a ward boy, who was in the habit of drinking the dregs of the stimulant mixture left by plague patients. He contracted the disease, and numerous plague bacilli were found in his blood. Under treatment his temperature fell to normal, and he became convalescent. Unfortunately, with the assistance of his wife, he surreptitiously obtained a large meal of curry and rice and died suddenly of syncope shortly afterwards. At the Grant Road Hospital a plague-stricken mother suckled her child during the course of her illness, and the child did not contract the disease. At the Parel Hospital a healthy mother suckled her plague-stricken child. The child died, whilst the mother was not infected. Two brothers, one of whom was suffering from plague, slept in the same bed, and continued to do so throughout the illness. The sick boy recovered, whilst the healthy boy did not contract the disease.

20. *Age and sex*.—The majority of hospital patients were men. We saw few females of marriageable age during our inspection, and hardly any children. Hence it is not probable that the true incidence of the disease on age and sex will be forthcoming from hospital statistics. It must be remembered in this connection that the disproportion of the sexes in Bombay as in other large Indian cities is very great, *viz.*, 518,000 males to 303,000 females, practically 5 to 3. Moreover, amongst those who left the city during the early months of the epidemic, doubtless a large number were women and children sent away for safety. To the facility with which children could be concealed from the search parties must also partly be ascribed the fewness of their number in the hospital registers, rather than to the supposition that they escaped the disease. Of 200 cases treated at the Grant Road Hospital, 67, or 33·5 per cent., were females, and 133, or 66·5 per cent., males. Of this number, 12 only, or 6 per cent., were under the age of 10 years. The following table gives the age of the 200 cases:—

	Age.	Cured.	Died.	Total.
1	2	3	4	5
Under	1 year.	0	0	0
"	1-5 years.	1	4	5
"	5-10 "	1	6	7
"	10-20 "	10	11	21
"	20-30 "	22	49	71
"	30-40 "	19	44	63
"	40-50 "	3	8	11
"	50-60 "	6	12	18
"	Over 60 "	1	3	4
		63	137	200

21. *Morbid Anatomy*.—On *post-mortem* examination the blood was found to be dark in colour, fluid, or imperfectly coagulated. The affected gland or glands were enlarged, softened, and hæmorrhages were present in their substance. The surrounding cellular tissues were infiltrated with blood oedematous. On section the gland presented a dark brown or purple appearance, the results of the hæmorrhage, and occasionally points of suppuration were seen. When prepared, sections of the gland showed the presence of numerous plague bacilli, whilst from the fluid exuding on section almost pure cultures of plague bacilli could be obtained by growth on agar agar. In addition to the affected gland, the glands of the abdomen and thorax were often found enlarged. The vessels of the stomach (cardiac end) and ileum were injected, and numerous small hæmorrhagic petechiæ were seen in their immediate neighbourhood beneath both the serous and mucous coats. Petechiæ were also frequently seen on the surface of the liver, pericardium, pleura and meninges. Occasionally hæmorrhages were seen in the perinephritic cellular tissue. The heart was invariably found healthy. The liver and spleen were occasionally slightly enlarged. In the lung cases there were usually one or more small patches of pneumonic consolidation in varying stages, slight pleuritic inflammation over these, and a considerable quantity of sero-sanguineous fluid in the bronchi, which were congested. Cultures from the spleen, the blood, the affected glands, and pneumonic cases from the surface section of the pneumonic areas almost invariably showed an abundant growth of plague bacilli.

22. *Bacteriology*.—The bacillus of bubonic plague was discovered independently by Yersin and Kitasato in 1894 during the epidemic of plague then raging in Hong-Kong. It has been found in the softened contents of the glands, the blood, spleen, the lungs, the sputum and also, it is stated, in the urine and feces of plague patients. The bacilli consist of short oval rods, which stain more distinctly at the end than in the middle, and hence resemble diplococci. It occurs singly in dumb-bells or in chains. It does not form spores nor liquefy gelatine and is non-motile

It is killed by a temperature of 60°C in five minutes (Klein) or by exposure to a temperature of 80°C (Kitasato). It can be grown on artificial culture media, agar agar, blood serum and in gelatine and bouillon. Inoculated into mice, rats, guinea-pigs and rabbits it produces acute hæmorrhagic, septicæmic infection and death. On agar agar the growth forms a whitish grey, slightly iridescent colony, with a bluish tint by reflected light; the small colonies resemble little tufts of glass wool. On gelatine the colony is light brown and finely granular.

The German Commission on Plague report (Deutsche Medizinische Wochenschrift) that in the great majority of cases it was found that the bubonic virus penetrated into the human body through small lesions of the skin. The glands of the neighbourhood then began to swell, and when the quantity of virus absorbed was not too large, they were able to retain and to destroy it. When the bacilli were present in large quantities, they made their way through the lymphatic glands, and were then found everywhere in the blood and in the internal organs. This was the typical form of bubonic septicæmia: when a gland suppurated, the bacilli might be removed from the body, but a dangerous septicæmia caused by streptococci might result. The bubonic bacilli were present in large quantity in the patient's urine and feces, and in this way the virus might become diffused. In another group of cases the virus was apparently absorbed by the lungs, and, under the circumstances, primary pneumonia was commonly found, the lungs containing plague bacilli together with diplococci and streptococci. It is obvious how dangerous the sputum of such patients must necessarily be. Primary infection from the intestinal canal was not observed in any instance, but sometimes it appeared to arise from the tonsils. For the purposes of a bacteriological examination, it was not sufficient to take a single drop of blood from the finger, as this method gave a satisfactory result only when the bacilli were present in a very large quantity. An agar culture must be made in doubtful cases: the colonies were usually developed after forty-eight hours. The bubonic glands should not be punctured for diagnostic purposes because of the risk of admitting the virus into the blood vessels. If blood serum obtained from either persons or animals convalescent from plague was mixed in a test-tube with a culture of plague bacilli, it had a specific influence on them. Culture of other bacteria treated in this way became opalescent throughout their whole extent, but the plague bacilli formed small conglobula which, in course of time, fell to the bottom of the test tube, leaving the supernatant fluid clear. This precipitation of the bacilli was identical with that observed in the case of enteric fever and cholera, and led to the inference that artificial immunisation against plague might be possible.

23. *Axillary buboes in women.*—Presuming the correctness of the view of the German Commission regarding the means by which the plague bacilli gain an entrance into the human body, it naturally follows that axillary buboes should be more common in women than men, since the hands of the former engaged in cleaning the floors of their dwelling, clothes, cooking pots, &c., and in nursing the sick, are more liable to come in contact with the plague bacilli than are the hands of the latter, who spend the day at work, away from home. On an examination of the figures at our disposal, we find that this is the case, vide following table:—

Grant Road Hospital (200 cases.)

	Proportion of males to females; all cases.	Buboes in axilla.	Buboes in groin.
1	2	3	4
Males	66.5%	59.3%	70.6%
Females	33.5%	40.7%	29.4%
Total	100.0	100.0	100.0

24. *Treatment.*—The treatment adopted at the plague hospitals (Parel, Grant Road, Arthur Road) we visited briefly was as follows:—

Plenty of fresh air and absolute rest in the horizontal position were the first essentials of treatment. No plague patient was allowed to sit up in bed until the temperature had remained normal or sub-normal for four or five days. In the majority of cases a preliminary enema purge was given, whilst from the onset almost free stimulation by alcohol and by food was necessary. At the Grant Road Hospital, where many patients were brought in a condition of collapse, an ounce of stimulant mixture was administered on admission as a routine procedure. Pyrexia was treated by tepid sponging, since the usual

chemical antipyretics were found to produce dangerous collapse. Ice bags applied to the head were found the best remedy for the delirium, although an occasional dose of bromide was given. For the vomiting when persistent, nothing succeeded better than liquor morphine internally with ice to suck and a mustard leaf to the epigastrium. Thomson (Parel Hospital) has great faith in the free administration of perchloride of mercury. For an adult he gave half an ounce of the liquor (P.) every two hours to four doses, and every six hours. He had never seen salvation occur in a plague patient as a result of this treatment. For the sleeplessness, opium in the form of full doses of liquor morphine was found more effective than hyosine. Strophanthus, digitalis and strychnine were all found useful at various times as danger threatened. Rum was the chief stimulant used, and as much as from four to six ounces daily were administered, made up in the form of a stimulant mixture. After various trials, the best treatment for the buboes was found to be to leave them alone or simply apply a little belladonna and glycerine. Thus treated, the majority of buboes in those who recovered underwent resolution. When suppuration occurred, the usual surgical treatment was adopted, viz., incision with all due antiseptic precaution followed by antiseptic dressing of the wound (Thomson). For the relief of the pain, hot poultices frequently changed were applied to all buboes until suppuration occurred, when they were opened with the usual antiseptic precaution (Dallas). The latter treatment seemed to greatly increase the number of buboes which suppurated, however much it relieved the patient temporarily (Dyson, Calvert). It was noted that the wounds left after incision of the buboes were in the majority of the cases slow to heal. The injection of the glands with various preparations, e.g., tinct. iodi, perchloride of mercury solutions or carbolic acid, was abandoned as useless after a brief trial.

25. Milk, rice congee, sage, arrowroot, egg-flip, chicken or goat soup (for Muhammadans), soda-water, etc., were used during the acute stage. Delirious patients frequently had to be fed by enema or the nasal tube. Subsequently, as convalescence advanced, the diet was gradually increased. Care was necessary here, as in some cases during convalescence the patient's appetite was very great, whilst to gratify it fully was to endanger his life from syncope.

26. *Serum treatment.*—It is a matter of regret that, owing to the absence from Bombay of Messrs. W. M. Haffkins and Dr. Yersin at the time of our visit, we were unable to observe the effects of the prophylactic treatment of the former and the results of the use of the curative treatment of the latter.

MEASURES TAKEN TO SUPPRESS THE PLAGUE.

Before considering the methods adopted to stamp out the plague, it will simplify matters if a few facts concerning Bombay itself are first given.

27. *Bombay.*—In point of numbers, Bombay is the first city in India and the second city in the British Empire. It is situated on the island of Bombay in latitude 19°N. and longitude 72°52'E. The island is connected to the mainland by two causeways—(1) Mahim and (2) Sion—and two railway bridges, viz., those of (1) Bombay and Baroda Railway and (2) Great Indian Peninsula, and by the main pipe and light tramway line of the Tansa Water-works. This peculiar situation of the city affords unusual facilities for controlling all ingress and egress since all persons entering or leaving the city must either come over seas or pass by one of those causeways or bridges. According to the last census, the population amounted to 821,764 persons spread over an area of 22 miles, thus giving an average density of 37,352 to the square mile. Unfortunately the population is not equally distributed, but varies within the widest limits amongst the 32 sections into which the city and island are divided. Thus the density ranges from 700 per acre in Kumbharwada to 4.6 to the acre in Sion, whilst an average of twelve sections have no less than 458 persons per acre. In these thickly populated wards, so narrow are the streets and so close together are the houses, that the latter occupy 85 per cent. of the ground area.

(To be continued.)

Reviews and Notices of Books.

A BOOK FOR EVERY WOMAN. PART II—WOMAN, IN HEALTH AND OUT OF HEALTH. BY JANE H. WALKER, L.R.C.P.I., L.R.C.S., M.D. LONGMANS, GREEN AND CO., LONDON, 1897. (Crown 8vo. pp. 160. 2s. 6d.)

"THIS book" the author says "is written with the desire and in the hope of raising the standard of general health among women." It is not a medical treatise, but is essentially a book of elementary common sense and will probably be of some use to those for whom it is intended.

The first chapter deals with some general topics of personal and domestic hygiene. The second chapter, on food and beverages, is good and contains some useful dietaries. The chapter on woman's education is very interesting and amusing. The author objects to the supposition that women are mere appendages to men and not independent human beings with their own lives to shape and their own salvation to work out. She says: "There is much charm, of course, and much that is romantic and attractive, in the old view of sexes as the ivy and the oak; but in practice we know that in our country there are not oaks sufficient for each ivy plant to have one to cling to, and moreover the ivy kills the oak, sapping its vitality!" In the chapter on recreation, the author properly introduces cycling. According to her—"It is a good and enjoyable sport. It exercises the legs and the lower part of the body and increases lung-power. Like everything else it is best done by one in good muscular training; and a girl who, perhaps, has never done any other active thing, who compresses her ribs with stays and her feet with shoes, such being the fashion, who buys a bicycle and learns to sit it, also being the fashion, is very likely to 'over-ride' herself and find that it does not agree with her! The extraordinary benefit derived from it by so many young women proves only how very little exercise they were in the habit of taking! A daily gentle run of a couple of miles would be much cheaper and far better training; cycling is useful and it is delightful and it is fashionable but it is not magical!" Next comes a chapter on puberty which ought to have been more elaborate. With regard to the management of the monthly period, the author holds that "when the whole matter is conducted in a physiological, i.e., normal manner, the less alteration there is from the ordinary course of life, the better it will be for the girl, both physically and morally." The final chapter, a very short one, is on the management of minor ailments, viz., diarrhoea, anaemia, rheumatism, headache, nervousness. It winds up with the enumeration of a few signs of serious illness calling for treatment by a physician.

Correspondence.

CHOLERA CASES IN GAYA.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

SIR,—The town of Gaya is visited by a large number of pilgrims every year, specially in the months of January, July, and September, when cholera breaks out among them and the residents. I, being in charge of the Cholera Hospital here, deal with many cholera cases, and keep myself ready to check the progress of the disease by order of the Health Officer. I am glad to note that only two persons have been attacked with a mild type of cholera out of the persons (about 400) inoculated by Dr. Haffkine. Both patients were cured.

I hope you will be pleased to insert this into your valuable paper.

GAYA CHOLERA HOSPITAL, } JUGO BONDHOO GUPTA,
Dated 25th July 1897. } Civil Hospital Assistant.

TYPHOID BACILLI AND THE BLOOD TEST.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

DEAR SIR,—At the present early stage of sero-diagnosis in typhoid fever perhaps this note may not be quite inopportune.

Not having previously seen the method applied, I asked Dr. Srinivasa Rao, Bacteriologist to the Government of Mysore, to kindly give a demonstration in case I could find the necessary material. This Surgeon-Colonel Lang Browne very kindly supplied in the South Station Hospital, Bangalore. That officer selected six patients, and, without giving Dr. Srinivasa any clue to the nature of their diseases invited him to apply Widal's test. The names of the patients with the diagnosis already arrived at by the medical officers in charge were banded to me on a closed slip of paper. I give the results in the following tabular form:—

1st Patient.—Specimen prepared at 9-10 A.M.
1st Microscopical Examination 9-15 A.M.; bacilli moving; no agglomeration.
2nd Microscopical Examination 9-20 A.M.; agglomeration in clumps of 6, 8, or 10, bacilli in clumps are all still; here and there in the field an isolated one still moves.
3rd Microscopical Examination 9-45 A.M.; same appearances as in last examination, except that there are fewer isolated bacilli moving.
Bacteriological diagnosis—Typhoid fever.
Clinical diagnosis by medical officer in charge—Typhoid fever.

2nd Patient.—Specimen prepared at 9-15 A.M.

1st Microscopical Examination 9-22 A.M.; bacilli very lively; no agglomeration.
2nd Microscopical Examination 9-27 A.M.; bacilli very lively; no agglomeration.
3rd Microscopical Examination 9-50 A.M.; bacilli very lively; no agglomeration.
Bacteriological diagnosis—*Not* typhoid fever.
(This turned out to have been blood from a healthy man who never had typhoid fever).

3rd Patient.—Specimen prepared at 9-27 A.M.

1st Microscopical Examination 9-30 A.M.; bacilli moving vigorously.
2nd Microscopical Examination 9-36 A.M.; clumps of five or six bacilli forming, some of the bacilli in the clumps are moving; isolated bacilli also moving.
3rd Microscopical Examination 9-52 A.M.; isolated bacilli moving feebly here and there. In the clumps one is seen also occasionally moving.

Bacteriological diagnosis—Typhoid fever.

Clinical diagnosis—Typhoid fever.

4th Patient.—Specimen prepared at 9-42 A.M.

1st Examination 9-45 A.M.; bacilli very vigorous; no agglomeration.
2nd Examination 10-12 A.M.; bacilli very vigorous; no agglomeration.

Bacteriological diagnosis—*Not* typhoid.

Clinical diagnosis—*Not* typhoid.

5th Patient.—Specimen prepared at 9-53 A.M.

1st Examination 9-56 A.M.; no agglomeration; bacilli very lively.
2nd Examination 10-3 A.M.; bacilli clinging to each other here and there, but again separating.
3rd Examination 10-19 A.M.; same as last time, but bacilli less lively.
4th Examination 2-0 P.M.; agglomeration well-marked.

Bacteriological diagnosis—typhoid fever.

Clinical diagnosis—typhoid fever supervening in a case of dysentery.

6th Patient.—Specimen prepared 10-15 A.M.; bacilli moving, and no agglomeration.

2nd Examination 10-30 A.M.; bacilli moving, and no agglomeration.

Subsequent examinations were made at intervals for 24 hours without any signs of agglomeration.

Bacteriological diagnosis—*Not* typhoid.

Clinical diagnosis—Opinion was divided as to the diagnosis. Spots had been found on the abdomen, which were equivocal in appearance. Surgeon-Colonel Browne has since informed me the patient was soon after discharged, the case proving to be one of simple continued fever.

I have given the experiments in detail to help any one who may for the first time be applying the test. A platinum loop of the blood is placed on a cover-glass, and ten loops of a 24-hour bouillon culture of the typhoid bacillus are placed along side it. The blood and culture are thoroughly mixed by means of the loop the cover-glass then carefully inverted on a clean slide, and the preparation examined with a $\frac{1}{2}$ -inch object-glass.

Of recent years many valuable additions have been made to the physician's armamentarium. But to my mind this serum method in typhoid fever eclipses all the rest. Its extreme simplicity is a great recommendation; and the fact that Eberth's bacillus is as efficient when dead as it is alive places the sero-diagnosis test within the reach of all.*

BANGALORE, }
9th August 1897. }

I am,
Truly yours,
JOHN SMYTH, M.D.,
SURGEON-MAJOR,
Darbar Surgeon, Mysore.

PECULIAR PIGMENTED CELLS FOUND IN TWO MOSQUITOES FED ON MALARIAL BLOOD.

TO THE EDITOR OF THE "INDIAN MEDICAL GAZETTE."

SIR,—I write in haste, hoping to be in time for the September number of the *Indian Medical Gazette*, to put on record a late "find" of mine in two mosquitoes fed on blood containing crescents. For the last two years I have been endeavouring without success to cultivate the malaria parasite in mosquitoes in this manner. In mosquitoes obtained in the ordinary way I have succeeded in distinguishing six new parasites (four of them protozoal), namely, a nematoid, a fungus, a gregarine,

* Vide Wright and Temple, *British Medical Journal*, 15th May 1897.

a sarcosporidium (?), a coccidium (?), and swarm-spores in the stomach; but I have not yet been able to trace any parasite to the ingestion of malarial blood. The species of mosquito used have generally been the various brindled species. Lately, however, on employing for the first time a new, brown species, of which I had very few individuals available, I was struck by observing in the only two in which the stomach was well dissected peculiar pigmented cells, the pigment of which exactly resembles that of the hæmameba.

The first mosquito was killed four days after feeding on malarial blood. The upper part of her stomach contained twelve round or oval cells, 12μ — 16μ in diameter; of a substance almost as delicate as the stomach-cells; with defined but delicate outline not at all amoeboid; full of stationary vacuoles, but without contractile vesicle or visible nucleus. What was very remarkable, however, was that these cells contained pigment identical in appearance with, but more scanty than, that of the malaria parasite.

The second mosquito (my last specimen of the species) was killed the next day, five days after feeding. Her stomach contained twenty-one cells of the same kind, only that they were more solid, with distinctly thicker outline, and considerably larger (16μ — 2μ).

The presence of pigment in these cells, exactly like that of the hæmameba, is of course very remarkable, such pigment being a unique product peculiar to the hæmameba in men and birds. I have never seen anything like it hitherto in any of the hundreds of mosquitoes examined by me. I think the matter is one deserving record, more especially as it may be weeks or months before I can obtain more of the special brand of mosquitoes in which I found the cells.

The mosquitoes have fawn-coloured wings with four black marks; thorax brown above and nearly black below; abdomen nearly white, with hairs, not feathers on it, and dark-brown below; proboscis and legs brindled white and dark-brown; eggs boat-shaped.

RONALD ROSS,
Surgeon-Major.

27th August 1897.

Appointments, Leave, &c.

BENGAL.

T. B. Kelly is appointed to have medical tation of Balsa Bhutan, Jalpaiguri, in addition to his own duties, *vice* Surgeon-Lieutenant E. E. Waters.

The services of the following Commissioned Medical Officers are replaced at the disposal of the Government of India, Home Department:—

Surgeon-Captain J. C. S. Vaughan.	Surgeon-Captain B. H. Deare.
" F. C. Clarkson.	" B. C. Oldham.
Surgeon-Captain C. R. Stevens.	

Surgeon-Captain B. C. Oldham made over charge of the Mymensingh Jail to Assistant-Surgeon Purna Chandra Purkait on the forenoon of 2nd August 1897.

Surgeon Captain J. T. Calvert is permitted to revert to his permanent appointment as Civil Surgeon of Bhagalpur, on being relieved of his present appointment as Inspecting Officer for the purpose of carrying out the provisions of the Epidemic Diseases Act at Khanna.

Surgeon-Captain C. E. Sander, Officiating Civil Surgeon of Bhagalpur, is appointed to be an Inspecting Officer for the purpose of carrying out the provisions of the Epidemic Diseases Act at Khanna Junction, East Indian Railway, *vice* Surgeon-Captain J. T. Calvert.

The services of the undermentioned commissioned Medical Officers are replaced temporarily at the disposal of the Government of India, Home Department:—

Surgeon-Captain J. G. Jordan, Officiating Civil Surgeon of Tippera.

Surgeon-Captain F. O'Kinealy, Officiating Second Resident Surgeon, Presidency General Hospital, Calcutta.

The services of the undermentioned second class Military Assistant-Surgeons are replaced at the disposal of the Government of India, Home Department:—

F. J. Salts.	E. A. Bedell.
F. G. Henderson.	

Assistant-Surgeon A. C. Champati received charge of the Krishnagar Jail on the forenoon of the 6th July 1897 owing to the death of Surgeon-Major G. Jameson on the evening of the 3rd July 1897.

Surgeon-Captain F. C. Clarkson made over charge of the Motihari Jail to Surgeon-Captain T. Grainger on the forenoon of the 1st August 1897.

Military Assistant-Surgeon E. A. Bedell acted as an Inspecting Officer for the purpose of carrying out the provisions of the Epidemic Diseases Act, 1897, at Katihar Junction, on the Eastern

Bengal State Railway, from the afternoon of the 5th to the afternoon of the 22nd August 1897, during the absence, on deputation, of Surgeon-Captain B. H. Deare.

Military Assistant-Surgeon W. Sherrington, attached to the Presidency General Hospital, Calcutta, is appointed to be an Inspecting Officer for the purpose of carrying out the provisions of the Epidemic Diseases Act, 1897, at Khanna Junction, on the East Indian Railway, *vice* Military Assistant-Surgeon E. A. Bedell, transferred.

Under Rule 1 of Plague Notification No. 3, dated the 17th August 1897, the following Medical Officers are authorised to examine passengers leaving the Port of Calcutta for Ports out of India:—

Ophthalmic Surgeon and Professor of Ophthalmic Surgery, Medical College, Calcutta.

Professor of Surgery, Medical College, Calcutta, and *ex-officio* 1st Surgeon to the College Hospital, Calcutta.

Surgeon Superintendent, Presidency General Hospital.

Professor of Midwifery, Medical College, and Obstetric Physician, Eden Hospital, Calcutta.

Professor of Vateria Medica, Medical College, and *ex-officio* 2nd Physician, Medical College Hospital.

Professor of Surgical and Descriptive Anatomy, Medical College, Calcutta, and *ex-officio* 2nd Surgeon to the College Hospital.

BOMBAY.

The services of Surgeon-Captain H. Bray, A.M.S., are replaced at the disposal of the Government of India with effect from the 25th July 1897.

Surgeon-Captain G. S. Thomson, M.B., I.M.S., gave over charge of his plague duties at the Parel Hospital, Bombay, on the 15th June 1897, and assumed similar duties under Government with effect from the 16th idem.

Surgeon-Captain H. Herbert, F.R.C.S., acting Ophthalmic Surgeon, is allowed privilege leave of absence for August 1897.

The services of the undermentioned officers are replaced at the disposal of the Government of India with effect from the dates specified against their names:—

Surgeon-Captain J. E. Brogden, A.M.S., 19th July 1897.

Surgeon-Captain M. Boyle, M.B., A.M.S., 8th July 1897.

Surgeon-Captain E. S. Clark, M.B., A.M.S., 9th July 1897.

Surgeon-Lieutenant N. R. J. Rainier, I.M.S., 21st June 1897.

Surgeon-Lieutenant P. Evans, M.B., A.M.S., 30th June 1897.

Surgeon-Lieutenant A. E. Milner, A.M.S., 30th June 1897.

Surgeon-Captain B. H. F. Leunann, M.B., I.M.S., has been appointed to the medical charge of the Plague Flying Column No. 1 with effect from the 26th July 1897, *forenoon*.

Surgeon-Major W. H. Quicke, Second Surgeon, J. J. Hospital, has been allowed by Her Majesty's Secretary of State for India to return to duty within the period of his leave.

Surgeon-Major D. C. Davidson, acting Surgeon, Gokaldas Tejpal Native General Hospital, Bombay, is allowed furlough for three months from 9th July 1897 or such subsequent date as he may avail himself of it.

Surgeon-Captain H. Herbert, F.R.C.S., has been appointed substantive *pro tem*. Ophthalmic Surgeon, Jamshedji Jijibhai Hospital, with effect from 31st May 1897.

His Excellency the Governor in Council is pleased to appoint Surgeon-Major C. Monks to act as Surgeon, Gokaldas Tejpal Native General Hospital, Bombay, pending further orders.

Under section 37 of the Code of Criminal Procedure, 1882, the Governor in Council is pleased to empower Surgeon-Captain J. L. T. Jones, M.B., I.M.S., Magistrate of the First Class in the district of Poona, to try in a summary way all the offences mentioned or referred to in section 260 of the same Code.

In modification of Government Notification No. 3763, dated 10th July 1897, it is hereby notified that Surgeon-Major C. Monks has been appointed to act as Surgeon, Gokaldas Tejpal Native General Hospital, Bombay, in addition to his own duties, with effect from the forenoon of 9th July 1897.

Surgeon-Major H. P. Dimmock resumed charge of his duties as Obstetric Physician, Bai Motilbai and Sir D. M. Potit Hospitals, on the afternoon of the 15th July 1897.

The services of Surgeon-Lieutenant A. Gwyther, M.B., C.M., I.M.S., are replaced at the disposal of the Government of India in the Home Department, with effect from the 23rd July 1897.

Assistant-Surgeon K. G. Pettigra has been appointed to the medical charge of the Railway Inspection duty at Manmad, with effect from 10th August 1897, *afternoon*.

Surgeon-Captain C. H. Bedford, M.D., C.M., I.M.S., took over charge of his plague duties at Mahabaleshwar on the 13th March 1897.

Surgeon-Captain G. W. Joneoy, M.B., M.Ch., I.M.S., was appointed to do plague duty in Karachi from the 16th April 1897 to the date on which he took charge of the appointment of special Port Health Officer, Karachi.

His Excellency the Governor in Council is pleased to make the

Surgeon-Major H. Herbert, F.R.C.S., to be Ophthalmic Surgeon, Bombay.

Surgeon-Major J. P. Barry, M.B., to be Civil Surgeon, Kaira, Superintendent, Lunatic Asylum, Colaba.

Colonel W. K. Hatch, M.B., C.M. (Aber.), F.R.C.S. (Lon.), has been appointed substantive *pro tem* Principal, Grant Medical College, in addition to his own duties, and Surgeon-Captain H. Horbert, F.R.C.S., substantive *pro tem* Professor of Ophthalmic Medicine and Surgery and Professor of Comparative Anatomy and Zoology in that College, with effect from 31st May 1897.

V. Kukday has been appointed to the Plague Flying Column No. 2, with effect from noon.

Surgeon-Captain G. S. Thomson, M.B., M.Ch., has been appointed to act as Civil Surgeon, Satara, with effect from the afternoon of the 30th July 1897, during the absence of Surgeon-Major D. C. Davidson.

The services of the undermentioned officers are replaced at the disposal of the Military Department, with effect from the dates on which they respectively made over charge of their duties under the Government of the North-Western Provinces and Oudh:—

Surgeon-Captain W. P. Barter, A.M.S.

Surgeon-Lieutenant E. B. Steel, M.B., A.M.S.

Surgeon-Lieutenant C. D. Dawes, I.M.S. (Bengal).

Surgeon-Lieutenant C. B. Harrison, M.B., C.M., I.M.S. (Madras).

Surgeon-Lieutenant A. Miller, I.M.S. (Madras).

Surgeon-Lieutenant H. R. Brown, I.M.S. (Madras).

The services of the undermentioned Military Assistant-Surgeons, of the Bengal Establishment, were placed at the disposal of the Government of the North-Western Provinces and Oudh for the periods noted against their names:—

2nd class, C. A. Farmer, from 27th March to 4th April 1897.

2nd class, H. V. Dewey, from 26th March to 1st April 1897.

CENTRAL PROVINCES.

The services of Surgeon-Lieutenant F. Wall, I.M.S., (Madras), are placed temporarily at the disposal of the Chief Commissioner of the Central Provinces for employment on famine duty, with effect from the date on which he assumed charge of his duties.

Under Section 6 of the Prisons Act, 1894, the Chief Commissioner is pleased to appoint Surgeon-Captain H. St. J. Fraser, Officiating Civil Surgeon, Hoshangabad, to the temporary medical charge of the Hoshangabad Jail.

Surgeon-Captain Fraser held charge of the jail from the afternoon of the 23rd July to the forenoon of the 18th August.

Under section 6 of the Prisons Act, 1894, the Chief Commissioner is pleased to appoint Surgeon-Captain A. G. Hendley, Civil Surgeon, Hoshangabad, to the executive and medical charge of the Hoshangabad Jail.

Surgeon-Captain Hendley assumed charge of his duties on the forenoon of the 18th instant.

Surgeon-Captain H. St. J. Fraser is appointed to officiate temporarily as Civil Surgeon of Hoshangabad with effect from the afternoon of the 23rd ultimo.

With reference to Order No. 5049, dated the 9th July, Surgeon-Captain A. G. Hendley assumed charge of the office of Civil Surgeon, Hoshangabad, from Surgeon-Captain H. St. J. Fraser, on the forenoon of the 18th August.

N.-W. PROVINCES AND OUDH.

The services of the undermentioned Medical Officers are replaced at the disposal of the Government of India, Home Department:—

Surgeon-Lieutenant C. D. Dawes, I.M.S. (Bengal).

Surgeon-Lieutenant C. B. Harrison, M.B., C.M., I.M.S. (Madras).

Surgeon-Lieutenant A. Miller, I.M.S. (Madras).

Surgeon-Lieutenant H. R. Brown, I.M.S. (Madras).

Surgeon-Captain J. Davidson, on plague duty at Allahabad, to be a Supernumerary Civil Surgeon, 2nd class, and to be posted to the Jaunpur district.

Surgeon-Captain J. Davidson, Supernumerary Civil Surgeon, from

Surgeon-Lieutenant C. B. Harrison, I.M.S., on plague duty, from Agra to Jhansi.

Surgeon-Lieutenant C. H. Bensley, I.M.S., on plague duty, from Cawnpore to Meerut.

Surgeon-Captain A. W. Dawson, I.M.S., from plague duty at Hardwar to that at Saharanpur.

Surgeon-Lieutenant-Colonel W. H. Cadge, I.M.S., from the Naini Tal Volunteer Rifles, to be Surgeon-Lieutenant-Colonel, *vice* Surgeon-Major Lukis, transferred.

Surgeon-Captain S. H. Henderson, Superintendent, Central Prison, Agra, privilege leave for three months with effect from the 12th July 1897.

Surgeon-Captain J. S. S. Lumsden, Officiating Chemical Examiner, on being relieved by Mr. E. H. Hankin, to the medical charge of the camp of His Honor the Lieutenant-Governor and Chief Commissioner.

Surgeon-Captain C. Thomson, Supernumerary Civil Surgeon, Fatehgarh, to officiate as Superintendent, Central Prison, Agra.

Surgeon-Major T. W. O'H. Hamilton, A.M.S., to the civil medical charge of Fatehgarh, in addition to his own duties, with effect from the 11th July 1897.

Surgeon-Captain J. S. S. Lumsden, in medical charge of the camp of His Honor the Lieutenant-Governor, to officiate as Chemical Examiner, Government Analyst and Bacteriologist for the North-Western Provinces and Oudh and Central Provinces, during the absence, on deputation, of Mr. Hankin.

Surgeon-Captain A. E. Roberts, Civil Surgeon, on being relieved of the medical charge of the camp of His Honor the Lieutenant-Governor and Chief Commissioner, to the Aligarh district.

Colonel H. Hamilton, I.M.S., to the civil Almora district, in addition to his military the 28th June 1897.

Surgeon-Captain A. E. Roberts, Civil Surgeon, Aligarh, furnished out of India on medical certificate for fifteen months.

Surgeon-Lieutenant-Colonel W. H. Cadge, Civil Surgeon, Bareilly, to hold visiting medical charge of the Pilibhit district, in addition to his other duties, pending the arrival of a Civil Surgeon.

The services of the undermentioned Warrant Medical Officers are replaced at the disposal of the Government of India, Home Department, with effect from the dates on which they are relieved of their duties:—

Military Assistant-Surgeon G. R. Haines.

Ditto C. A. Farmer.

Ditto A. E. Clarke.

Ditto M. M. O. J. Apcar.

Ditto H. A. Richardson.

Ditto N. A. Lomondine.

INDIA.

The services of the undermentioned officers are replaced temporarily at the disposal of the Military Department, with effect from the dates on which they respectively made over charge of their duties under the Government of Bengal:—

Surgeon-Captain F. C. Clarkson, I.M.S. (Bengal).

Surgeon-Captain J. C. S. Vaughan, M.B., C.M., I.M.S. (Bengal).

Surgeon-Captain B. H. Deare, I.M.S. (Bengal).

Surgeon-Captain B. C. Oldham, I.M.S. (Bengal).

Surgeon-Captain C. R. Stevens, M.D., F.R.C.S., I.M.S. (Bengal).

The services of the undermentioned officers are replaced at the disposal of the Military Department, with effect from the dates on which they respectively made over charge of their duties under the Government of the North-Western Provinces and Oudh:—

Surgeon-Captain W. P. Barter, A.M.S.

Surgeon-Lieutenant E. B. Steel, M.B., A.M.S.

Surgeon-Lieutenant C. D. Dawes, I.M.S. (Bengal).

Surgeon-Lieutenant C. B. Harrison, M.B., C.M., I.M.S. (Madras).

Surgeon-Lieutenant A. Miller, I.M.S. (Madras).

Surgeon-Lieutenant H. R. Brown, I.M.S. (Madras).

The services of the undermentioned officers are replaced at the disposal of the Military Department, with effect from the dates mentioned against their names:

Surgeon-Lieutenant H. J. Walton, I.M.S. (Bengal),—21st June 1897.

Surgeon-Lieutenant H. A. D. Dickson, I.M.S. (Bengal),—23rd June 1897.

The services of the undermentioned officers are replaced temporarily at the disposal of the Military Department, with effect from the dates on which they respectively made over charge of their duties under the Government of Madras:—

Surgeon-Captain Robert King Mitter, M.B., I.M.S. (Madras).

Surgeon-Captain J. L. Macrae, M.B., C.M., I.M.S. (Madras).

The services of the undermentioned officers are replaced at the disposal of the Military Department, with effect from the dates on which they respectively made over charge of their duties under the Government of Madras:—

Surgeon-Lieutenant E. M. Mington, I.M.S. (Madras).

Surgeon-Lieutenant F. D. Browne, I.M.S. (Madras).

Surgeon-Captain J. H. Farmer, A.M.S., Nowgong, is appointed to the medical charge of the Bundelkhand Political Agency, in addition to his military duties, with effect from the 20th June 1897.

The undermentioned officers have been permitted by the Secretary of State for India to retire from the service, with effect from the dates specified, subject to Her Majesty's approval:—

Surgeon-Colonel George Cumberland Ross, I.M.S., (Bengal), Inspector-General of Civil Hospitals, Bengal,—1st October 1897.

Brigade-Surgeon-Lieutenant-Colonel George Archibald Macdonald, M.D., I.M.S. (Bombay),—22nd June 1897.

Surgeon-Lieutenant-Colonel Alexander John Willcocks, I.M.S., to be Surgeon-Lieutenant-Colonel, with effect from the 24th July 1897, *vice* Cadge, transferred to the Rohilkhand Volunteer Rifles.

The services of Surgeon-Lieutenant F. Wall, I.M.S., (Madras), are placed temporarily at the disposal of the Chief Commissioner of the Central Provinces for employment on famine duty, with effect from the date on which he assumed charge of his duties.

The date of retirement of Senior Assistant-Surgeon, with the honorary rank of Surgeon-Major, William Fearn, Bombay Establishment, is altered to 12th February 1897.

The services of Surgeon-Lieutenant J. O. Robertson, M.B., C.M., I.M.S., Bengal, are placed at the disposal of the Foreign Department, with effect from the 16th May 1897.

The services of the undermentioned officers are replaced temporarily at the disposal of the Military Department, with effect from the dates on which they respectively made over charge of their duties under the Government of Burma:—

Surgeon-Captain F. J. Dewes, I.M.S. (Madras).

Surgeon-Captain Kanta Prasad, M.B., I.M.S. (Bengal).

Surgeon-Captain C. E. Williams, M.B., B.S., I.M.S. (Bengal).

The services of Brigade-Surgeon-Lieutenant-Colonel C. Little, M.D., I.M.S. (Madras), Sanitary Commissioner, Hyderabad Assigned Districts, are placed temporarily at the disposal of the Foreign Department.

The services of Surgeon-Captain P. Hehir, M.D., I.M.S. (Bengal), are replaced at the disposal of the Military Department, with effect from the date of relinquishing charge of his duties as Staff Surgeon, His Highness the Nizam's Troops.

The following appointment is made to the staff of the 2nd Reserve Brigade:—

To be Principal Medical Officer Brigade-Surgeon-Lieutenant-Colonel R. G. Thomson, Army Medical Staff, from the Brigade.

The Queen has also approved of the resignation of the service by the undermentioned officers:—

INDIAN MEDICAL SERVICE.

Surgeon-Captain Frederic Hewlett Burton-Brown, Bengal Establishment. Dated 2nd June 1897.

Surgeon-Lieutenant Alfred Moore, Madras Establishment. Dated 15th April 1897.

The Queen has been graciously pleased, on the occasion of the celebration of the completion of the sixtieth year of Her Majesty's reign, to make the following promotion in, and appointment to, the Most Exalted Order of the Star of India:—

To be a Companion.

Surgeon-Major General James Cleghorn, M.D., Director-General of the Indian Medical Service.

Surgeon-Lieutenant-Colonels to be Brigade-Surgeon-Lieutenant-Colonels.

BENGAL ESTABLISHMENT.

Edgar Geor Russell. Dated 21st December 1896.

BOMBAY ESTABLISHMENT.

William McConaghy, M.D. Dated 14th October 1896.

Thomas Stephenson Weir. Dated 31st March 1897.

Surgeon-Majors to be Surgeon-Lieutenant-Colonels.

BENGAL ESTABLISHMENT.

William Owen, M.D.
Walter Conry.
George Jerome Kelly.
Dharmadas Basit.
Alexander William Mackenzie.
Jeremiah Mullane, M.D.
Douglas French-Multon, M.D.
James Alexander Neli.
Aylmer Martin Crofts.
James Crofts, M.D.
William Coates, M.D.

MADRAS ESTABLISHMENT.

Henry Augustus Fitzroy Nailer.
Nityananda Chatterjee.

BOMBAY ESTABLISHMENT.

William Keith Hattell.
Hormasji Dadabhai Masani.
Kanōbā Ranchoddās Kirtikar.

Surgeon-Captains to be Surgeon-Majors.

BENGAL ESTABLISHMENT.

Francis James Drury.
Horbert Jekyl Dyson.
Frederick Arthur Rogers, D.S.O.
Edward Richard William Charles Carroll.
The Queen has also approved of the retirement from the service of the undermentioned officers:—

INDIAN SUBORDINATE MEDICAL DEPARTMENT.

Senior Assistant-Surgeon, with the honorary rank of Surgeon-Captain, John Fitzpatrick, Bengal Establishment. Dated 11th November 1896.

Senior Assistant-Surgeon, with the honorary rank of Surgeon-Captain, Henry Hawkes, Madras Establishment. Dated 1st January 1897.

The undermentioned officers are permitted by the Secretary of State to retire from the service, with effect from the date specified subject to Her Majesty's approval:—

Surgeon-Lieutenant-Colonel Stanley Locker Dobie, Indian Medical Service (Madras),—6th July 1897.

Honorary Surgeon-Captain Stephen Chalke, Senior Assistant-Surgeon, Indian Subordinate, Medical Department (Madras), with effect from the 29th April 1897.

VOLUNTEER CORPS RESIGNATION.

Surgeon-Captain R. H. Nailer, Unattached List, resigns his commission.

The services of the undermentioned officers are replaced at the disposal of the Military Department, with effect from the dates noted against their names:—

Surgeon-Captain J. E. Brogden, A.M.S., 19th July 1897.

Surgeon-Captain H. A. Bray, A.M.S., 25th July 1897.

Surgeon-Captain E. S. Clark, M.B., A.M.S., 9th July 1897.

Surgeon-Captain M. Boyle, M.D., A.M.S., 8th July 1897.

Surgeon-Lieutenant P. Evans, M.B., A.M.S., 30th June 1897.

Surgeon-Lieutenant A. E. Milner, A.M.S., 30th June 1897.

Surgeon-Lieutenant N. R. J. Rainier, I.M.S. (Bengal),—21st June 1897.

Surgeon-Major R. W. E. H. Nicholson, A.M.S., medical charge of the Station Hospital, Nowgong, is appointed to the medical charge of the Bundelkhand Political Agency, in addition to his military duties, with effect from the 8th July 1897.

Surgeon-Captain W. Henvey, I.M.S., (Bengal), officiating Residency Surgeon and *ex-officio* Assistant to the Political Resident in Turkish Arabia, (m.e.) for six months.

Surgeon-Lieutenant-Colonel E. Lawrie, M.B., I.M.S., (Bengal). Residency Surgeon at Hyderabad, is granted privilege leave for three months, with effect from the 15th July 1897.

Brigade-Surgeon-Lieutenant-Colonel C. Little, M.D., I.M.S., (Madras), Sanitary Commissioner, Inspector-General of Dispensaries and Superintendent of Vaccination in the Hyderabad Assigned Districts, is appointed to officiate as Residency Surgeon at Hyderabad, with effect from the 15th July, 1897, and during the absence on privilege leave of Surgeon-Lieutenant-Colonel E. Lawrie, M.B., or until further orders.

MEDICAL.

* Surgeon-Major H. N. Thompson, from 21st July to 24th October 1897, inclusive, on private affairs.

Acknowledgments.

JOURNALS RECEIVED.

Lancet—British Medical Journal—The Practitioner—Edinburgh Medical Journal—American Journal of Obstetrics—Dublin Journal of Medical Science—Archives of Gynecology and Obstetrics—Manual of Gynecology and Padiatry—Therapeutic Gazette—Provincial Medical Journal—The Journal of the American Medical Association—New York Medical Journal—Medical Record, New York—Boston Medical and Surgical Journal—Times and Register, Philadelphia—Abstract of Sanitary Reports, United States—Occidental Medical Times—Merk's Bulletin of Advanced Medicine and Surgery—Medical and Surgical Reporter—The American Journal of the Medical Sciences—Medical Chronicle—Times and Register—Sanitary Record—Medical Press and Circular—La Tribune Medicale—La Reforma Medica—Gazette Hebdomadaire—South Russian Medical Gazette—Archives Cliniques de Bordeaux—Gesundheitsrat—Montreal Medical Journal—Dietetic and Hygienic Gazette—Toledo Medical Compend—The Bristol Medical-Chirurgical Journal—Pacific Medical Record—La Mercedi Medical—Annales de La Policlinique De Lille—United Service Gazette—Indian Medical Record—Indian Medical Reporter—Indo-European Correspondence—Indian Medical Chirurgical Review—O. Archivio Medico da India, Goa.

BOOKS AND PAMPHLETS RECEIVED.

Mental Diseases. By A. Campbell Clark, M.D., F.R.P.S.G.
Eyo-strain in Health and Disease. By Ambrose L. Rauney, A.M., M.D.

COMMUNICATIONS RECEIVED.

Surgn-Major Walsh, Midnapore—Dr. Hayman Thornhill, Ceylon—A. Powell, Esq., M. Ch., B.A., Cachar—Wyatt Johnston, M.D., D.D., and D.D. Macaggart, M.D., Montreal—Jr. Fedley, Rangoon—Surgeon-Major J. Smith, Mysore—Brigade-Surgn.-Lieut. Col. Joubert, Calcutta—Dr. Kodur Nath Das, Calcutta—Brigade-Surgn.-Lieut. Col. McLeod, London—Surgn.-Capt. Moir, Calcutta.

Contributors of original articles will receive twenty-five copies of their papers.

Original Communications.

ELEPHANTIASIS IN CEYLON: ITS PREVALENCE IN VILLAGES NEAR THE SWAMPY GROUND OF OLD ABANDONED TANKS.

BY HAYMAN THORNHILL, M.D.,

Senior Medical Officer, Northern Province, Ceylon.

DURING 1894 and 1895 I had been engaged in examining day and night-blood from inhabitants of many districts of different provinces of Ceylon, but in none had I found the filaria embryos except in night-blood from inhabitants of Galle and Colombo, in both of which places elephantiasis is endemic and has been so for ages: thus, again, the co-existence of filaria nocturna and elephantiasis was demonstrated and strong support afforded us to the possible, if not absolutely certain, relationship between them as cause and effect.

2. On 22nd March 1896, when visiting Batalagoda Dispensary, which is close to the Batalagoda tank, some 8 miles from Kurunegalle and some 40 miles distant from the sea, Mr. Parker, of the Irrigation Department, who has been resident there for some years, and who has travelled much through the villages, mentioned to me that there were many cases of elephantiasis in the villages.

3. On receipt of this information, I determined to proceed to Batalagoda again as I was anxious to satisfy myself:—(a) Whether the cases which Mr. Parker had seen were really cases of elephantiasis; (b) if so, whether they were endemic or imported; (c) if endemic, whether there was any special cause which might be dealt with; (d) whether the filaria nocturna or diurna was prevalent in the inhabitants of these villages; (e) whether any other forms of filarial disease, such as elephantiasis of the scrotum or labia, chyluria, lymph scrotums, &c., existed; and (f) lastly, as to the number of villages and people affected, and as to the effect on the health and labour of the people. I accordingly went there on 11th April 1896, and, accompanied and assisted by Mr. Parker, visited several of the villages and obtained the following information, which yet again shows the co-existence, and thus points to the relationship between filaria nocturna and elephantiasis, though it shows the erroneousness of the idea that elephantiasis is endemic only within 10 miles of the sea.

4. (a) I saw myself some 20 cases of developed elephantiasis, and heard of many more in 10 of the villages immediately about Batalagoda tank and in 6 of the villages about Nelligama tank, which is some 5 or 6 miles from Batalagoda, and the inhabitants of these villages informed me that such cases exist in other villages

beyond theirs, viz., in villages towards Wariapolla, and near to Kurunegalla town.

(b) The disease is clearly endemic and has been so for ages. Many of the oldest inhabitants say their fathers and uncles suffered from it, and that they told them it existed in these villages from ancient times.

(c) There can be no doubt but that the existence of the disease was closely connected with the former condition of the Batalagoda tank. This tank was made in remote ages by the Singhalese kings, but the bund was breached hundreds of years ago and, until recently restored, the bed of the tank was merely a swampy bog containing pools or puddles in several places which were overgrown with rank vegetation; these pools contained tank fish, which the inhabitants of the surrounding villages were in the habit of catching for food. The Singhalese name for elephantiasis is "Barawa" (which means large and heavy), the people recognised that this disease was connected with the water of this tank and of similarly breached and overgrown tanks, which they speak of as "Barawa waters;" they believed, however, that the cause of the disease entered the body through ulcers on the legs of those who stood in the water when fishing; but, as many who did not fish in the tank suffered from the disease, they believed that it was caused also by eating the tank fish; this of course is erroneous, the real explanation being that mosquitos were (and, as I found, are) abundant in the neighbourhood of these old swampy tanks, and that the filaria embryos are thus conveyed to, and are most probably abundant in, the water of these tanks, and in the wells of the villages in their neighbourhood, and that the inhabitants of these villages were and are infected from these village wells, but no doubt those who occupied themselves constantly in fishing in the tank itself would, whilst so employed, drink the tank water, and would thus be additionally exposed to infection.

As I mentioned before mosquitos of various kinds are particularly abundant. I captured specimens of 4 entirely different kinds, viz. (1) the ordinary large tiger or striped kind; (2) a large unstriped black kind with a long snout; when this mosquito alighted on a wall (or other surface) it stood out perpendicularly thus—/; (3) a very small light coloured one, more like a gnat; and (4) a small unstriped reddish or brownish kind. I ascertained from the people of several of the infected villages that all these kinds, but especially Nos. 3 and 4, were prevalent at their villages.

(d) I got 15 healthy inhabitants of certain of these Batalagoda infected villages (i.e., healthy in so far that they presented no signs or symptoms of elephantiasis) to come to the Batalagoda Dispensary and to sleep there, and about 10 P.M. I obtained one slide of blood from each; in 6 of these 15, i.e., in 40 per cent. I found the filaria

nocturna in abundance. It is not improbable that had I collected 2 or 3 slides from the other 9, or if blood was taken from them on another occasion, filarial embryos would be found in some of them also. However, that the filaria was found in 40 per cent. of the as yet healthy inhabitants of these villages shows how prevalent it is in these villages, and accounts for the great prevalence of cases of developed elephantiasis there. I also examined the night-blood of cases of developed elephantiasis, and the day-blood of 3, but in none of the slides could I find either filaria nocturna or diurna, or any kind of filaria.

(e) Though cases of elephantiasis affecting one or both legs, or both legs and one arm were numerous in both men, women and children, I was unable to discover or to hear of any cases of elephantiasis of the scrotum or labia or breasts, or of chyluria, or lymph scrotum; this, however, may be due either to reluctance on the part of the sufferers to speak to me or to others of disease affecting these parts, or to the fact that they had not recognised these affections as being related to "Barawa," i.e., the elephantiasis of the limbs. It is certain, however, that where elephantiasis of the limbs is so common, the other filarial affections must be more or less frequent also; and I have no doubt, but that further inquiries will show this to be so.

(f) I have shown above that cases of elephantiasis were known to be numerous in some 16 villages about Batalagoda and Nelligama tanks, and that it was spoken of as prevalent also in other villages beyond these. As to the serious effects of this disease on the health and labour capacity of these villages and villagers there can be no doubt; nearly all the cases of developed elephantiasis that I saw were unable to work, owing to the constant recurrence of elephantoid (I prefer the term filarial) fever accompanied with pain and increased swelling of the affected limbs; in some this fever and pain recurred every 3 or 4 days, in others once a week, and in a few about every 10 days; in all it lasted for 2 or 3 days, and then subsided, I saw several in which both legs were affected, some in which one leg and one arm were affected, and two in which both legs and one arm were affected. I noticed with surprise that in no case, even in those of 10 or 15 years' duration, was there enlargement or distortion of the leg or foot or thickening of the skin to the extent to which it is so often seen elsewhere in developed elephantiasis; this was particularly noticeable in the case of a woman of Kumbalange village with elephantiasis of one leg of 15 years' duration; the leg was considerably enlarged, but the skin was soft and not much creased or folded; this woman suffered great pain and distress, and her health was much affected by the recurrence of filarial fever and pain every 3 or 4 days. This

absence of extreme enlargement and distortion seems to be associated with the constant recurrence in all these cases of this filarial fever and pain. In my experience of cases of elephantiasis attended with great enlargement, thickening and distortion, this fever is by no means frequent, occurring, perhaps, only 2 or 3 times a year, the sufferers being thus able to work during the long intervals. The frequent recurrence of the fever and pain seems to be a special feature of these Batalagoda cases, with the result, of course, that the sufferers are practically entirely prevented from working, as they all are more or less constantly sick and suffering; it may be that this is due to the constant presence in them of living adult filariæ discharging swarms of embryos into their blood (this, however, seems to be negatived by the fact that in none of these cases of developed elephantiasis did I find embryo filaria in the blood), or it may be that it is due to the malaria from which these people also suffer more or less constantly.

5. These villagers know the premonitory symptoms well; all gave the same account of it, viz., fever lasting for 2, 3 or 4 days attended with pain in the limb which slightly enlarges, then subsidence of the fever and swelling and disappearance of the pain, then some days of freedom, and then a recurrence of the symptoms until at last permanent enlargement results: many who yet have no permanent enlargement of a limb suffer from this fever and pain, and know that they have got the "Barawa" disease; when these primary stage cases are added to those with permanent enlargement, who also suffer regularly every 3 or 4 days from these recurring attacks in a severer form, and when it is found that several in one family are affected (I heard of one family of 8, of whom 4 were sufferers), it can easily be understood how seriously the working capacity of the villagers is affected and what their sufferings are from this cause and from the malaria which is also prevalent.

6. All these villagers came to me anxiously expecting to hear of some remedy to cure the sick and to prevent the disease, but to all I had to convey the dismal intelligence that I was unable to do anything to relieve the sufferers, and but little to check the spread of the disease, as I said I feared they would not act on the only advice I could give them, viz., to carefully boil all water before drinking it. Mr. Parker, who takes the greatest possible interest in these villagers, most carefully explained for me at each village the cause of the disease and the warning to boil all drinking water, telling them that this would also save them from much malarial fever.

7. The recently completed restoration of the Batalagoda tank, which is now filled with water, will of course in time reduce to some

extent the prevalence of this disease by the removal of the swampy places and pools, the water of which was drunk by those employed in fishing there, and the channels from the tank will provide better, *i.e.*, less filaria-infected water for some villages along their banks, but its effect in this way must of course be small and slow, but the indirect benefits of the wise and considerate policy that restored these tanks and thus provided water, which means food, to these miserably poor and suffering people is very great, and the results are palpable and most encouraging.

8. As I said before, it is, I fear, hopeless to expect that villagers will boil all water before drinking; but in view of the great prevalence of this disease in these villages and of the enormous amount of pain and suffering, and hence loss of labour that it causes, *I think that whatever is possible should be done to check or limit the occurrence of these cases in the future.* I therefore proposed and urged that Government should at once undertake the construction at each of these villages, and at any others where similar cases exist, of wells properly sunk, lined and covered over. This can, I believe, be done at a very small cost by using the large earthen rings made by village potters, which, when properly set in well puddled clay, constitutes a most effectual lining which lasts for centuries, and as one, or rather the chief of the objects is to exclude filariated mosquitos from finding access to these wells, the top ring should be of iron, or of specially thick, hardened and glazed pottery or cement, and it should project a foot or 18 inches above the ground and should be provided with a wooden cap or lid, and special instructions should be given to the village headmen and villagers (and special measures taken to see that these instructions are attended to) that the mouths of these wells are to be kept constantly covered over.

9. I here quote the remarks made in paragraph 49 of my Annual Report for 1895, *viz.* : "I would suggest that all medical officers should be asked to keep a register of all cases of elephantiasis, chyluria, and lymph scrotum, or other filarial disease, showing the name, age, sex, date of first symptoms, where then living and where living previously, it would thus be possible to construct a filarial map of Ceylon, showing where the parasite was endemic, and of course to take steps for the prevention of the disease by attention to the water-supply."

28,000 HEIGHTS AND WEIGHTS.

By SURGN.-CAPT. W. J. BUCHANAN, B.A., M.B.,
Dip. State Med.,

Superintendent, Central Jail, Buzar.

THE following table gives the relative heights and weights of over 28,000 healthy prisoners admitted during the past few years into the

Central Jail, Bhagalpur, and other Bengal Jails. It will be, perhaps, remembered that in these columns in 1895, I published a table of heights and weights based upon some 8,000 measurements. Since then I have collected a large number more, both in jails of which I had charge, and from many medical officers who kindly sent me figures from their jails. Also the Inspector-General of Jails, Bengal, published my formula in Circular No. 19, dated 27th April 1895.

In the Bengal Jail Administration Report for 1896, a table on this subject is given in which my original figures are compared with a few hundred weights and heights collected in the other central jails of this Province; but these figures are obviously far too few to be of any importance. To attempt to settle such a question as the average weight of a man of say 5 feet 2 inches, from a hundred or so observations, is as absurd as it is misleading. Therefore, as a reference to the table in the Administration Report will show, while the figures from individual jails do not exactly agree with my figures as therein quoted, yet it is a noteworthy fact that the total averages given in column 10 as a result of 7,848 measurements practically agrees with my formula as given in Inspector-General's Circular above quoted. This formula is as follows: *Taking 5 feet as equal to 100lb. add 3lb. in weight for every full inch above that, e.g., 5 feet 6 inches = 100 + 3 × 6 = 118lb.* To this I am now inclined to add "for heights of 5 feet 8 inches and upward add 4lb. per inch instead of 3lb."; but as I do not consider that I have a large enough collection of figures of heights above 5 feet 8 inches I am not dogmatic on this point. In the following table I have purposely omitted parts of a lb., and fractions of an inch, treating only the round numbers 5 feet 1 inch, 5 feet 2 inches, &c. The daily and weekly variations of weight—a subject on which I have collected a lot of undigested information,—are sufficiently large to allow us to avoid fractions:—

TABLE.

Height.	Weight.	No. of Observations.	Percentage.
5'	100	1863	6.5 per cent.
5' 1"	102	2059	7.2 "
5' 2"	106	5226	18 "
5' 3"	109	5787	20 "
5' 4"	112	6107	21 "
5' 5"	115	3040	10 "
5' 6"	118	2498	8.7 "
5' 7"	121	1389	4.8 "
5' 8"	125	623	2.1 "
5' 9" and upwards.	129	220	.7 "
		Total 28,863.	

I think it will be agreed that this total 28,863 is sufficiently large to draw safe conclusions

from. I must note that all the above figures are taken from Bengali and (chiefly) Behari prisoners on admission to jail in good health, and that all were adults from 25 to 45 years, young and old men were specially excluded. Considerable misconception has arisen as to the exact value of my former tables of this kind. The above weights for each inch between 5 feet and 5 feet 9 inches of course are only averages, and, being such, cannot be expected to apply with accuracy to every individual case. It has been laid down by statisticians that in such cases the facts (1) must be all correctly observed; (2) that they must be of the same kind and order; (3) must be localised with regard to time and place; and (4) they must be sufficiently numerous and extend over sufficient length of time. I think I may claim that these conditions are complied with in the collections upon which the above table is based. Also, as the mathematicians have laid down that "the error diminishes as the square-root of the number of observations," which in plain English means, the larger the number of facts collected, the smaller will be the margin of error. It is consequently very satisfactory to me that my formula above, which was originally founded on some 5,000 observations, was confirmed by a collection of 20,000; by the Jail Administration Report collection of 7,848; and by the large table given above, *viz.*, 28,863. I think the above total has as much claim to confidence as giving a correct relative weight for height of the ordinary peasant of Bengal as any similar table compiled for Europeans, *viz.*, Liharzik's, or Allen's, or as Lombroso's very similar formula for Lombardy peasants. As regards its practical use in jails, continued experience for the past three years has shown me that it is a safe rule for jailers and non-medical jail officials that no man is fit for the severer forms of jail "hard labour" whose relative weight is not up to the standard above. Another use which has been made of the formula (*e.g.*, by Surgeon-Captain T. Grainger in the famine district of Champaran this year) is that it can be made the basis of comparison of the health of prisoners admitted in famine, or unhealthy years, and other normal years. But besides the above practical uses of this easily remembered formula it is not without anthropological interest.

The table for example shows that 59 per cent. of the classes admitted as prisoners vary from 5 feet 2 inches to 5 feet 4 inches in height; that 13 per cent. are below 5 feet 2 inches and only 28 per cent. above 5 feet 4 inches, and indeed only about 3 per cent. are of 5 feet 8 inches and upwards. Also it may be noted that the average weight of a prisoner based on above table is only 109 lbs., which was the average taken by me in calculating the nutritive value of jail dietaries (*vide* "Indian Medical Gazette", May, 1896). Lyon gave 105 lbs. as average weight of 534 prisoners in Bombay, and Lewis

put 103 lbs. for Bengalis and North-Western Provinces men as 110 lbs. The average height of the Bombay prisoners above is given by Lyon as 5 feet 3 inches. This agrees with the table above. I hope in a future communication to go into the question of chest-girth in relation to height and weight. I think it is to be regretted that more work is not done in this direction in India,—anthropological statistics of the races of India are few and far between.

A NOTE ON MELANOGLOSSIA.

By SURGN.-CAPT. F. P. MAYNARD, I.M.S.,
Offg. Civil Surgeon of Lohardaga.

WHEN examining coolies for emigration from Lohardaga to Assam during the last cold season, the number of pigmented tongues met with was rather striking, and some observations were made on their frequency, &c. These observations are principally of anthropological interest. Their pathological significance is *nil*, and this probably accounts for the slight attention paid to them in our text-books. Hilton Fagge, after briefly describing maculæ, ephelides and lentigo, mentions that "precisely similar minute dark spots appear in covered parts of the skin, and in mucous membranes sometimes along with the melasma of Addison's disease or from pigmentation from malaria, and sometimes in conditions of health. Others are congenital and may then be described as pigmentary nævi or mother's marks."

The coolies were examined consecutively and taken haphazard, not selected.

In all 347 tongues were noted, and pigmentation was found in 111 or 32 per cent.; 203 were males, and in them 67 tongues or 33 per cent. were pigmented; 144 females were examined, and 44 pigmented tongues or 30.5 per cent. found.

The distribution of the races in which they were found was as follows:—

MUNDA	...	{ m. 18 out of 38 = 47.3% } 27 out of 56, 48.2%
		{ f. 9 out of 18 = 50% }
ORAON	...	{ m. 9 out of 20 = 45% } 19 out of 40, 47.5%
		{ f. 10 out of 20 = 50% }
KHARIA	...	{ m. 4 out of 15 = 26.6% } 9 out of 25, 36%
		{ f. 5 out of 10 = 50% }
BRUIAN	...	{ m. 13 out of 23 = 56.5% } 19 out of 40, 47.5%
		{ f. 6 out of 17 = 35.3% }
OTHER CASTES	...	{ m. 23 out of 107 = 21.5% } 37 out of 186, 19.9%
		{ f. 14 out of 79 = 17.7% }

The other castes include a considerable number of castes of Aryan origin, and the relative infrequency of pigmented tongues among them (19.9 p.c.) compared with their frequency among the Dravidian tribes (average 44.8 p.c.) confirms the general impression I had formed that the pigmentation of the tongue varies with the pigmentation of the skin. For the Kolarian tribes (Mundas, Oraons, Kharias, &c.) have, as a rule the blackest skins possible, and the depth of the skin pigment was generally observed to correspond directly with the depth of the tongue



TWO CASES OF YAWS.—The woman shows a not uncommon 'ring' form on the abdomen.

pigment. The distribution and extent of the discoloration varied greatly. In some cases the fungiform papillæ were each surrounded by a blue or brown rim, giving the tongue a curious speckled look; in others there were irregular blue or black blotches, simple or multiple, and varying in size from a two-anna bit to a rupee on the dorsum or along the edges of the tongue. In one only was the whole tongue black. In no case were the gums or the roof of the mouth pigmented. The marks were found at all ages, though more commonly more widely spread and of deeper hue in adults than in children.

The children of 46 parents who had pigmented tongues were examined with the following results:—Of 16 sons of melanoglossal fathers, 7 had their tongues pigmented, 4 daughters of the same group of fathers showed no marks. Of 14 sons of melanoglossal mothers, 3 had pigmented tongues, and of 12 daughters of the same 3 were pigmented.

As far as could be ascertained, the pigment was not in any way due to malaria. Enlarged spleens were not found more frequently in those who had than in those who had not pigmented tongues.

Thus melanoglossia, as far as these 347 cases go, would appear to be largely a question of race, and to be more common the lower the race is in the scale of civilisation. It is almost equally

common in the two sexes. It would appear to be hereditary, though not necessarily appearing in early childhood. No connection with any diseased condition was to be made out.

IS YAWS SYPHILIS?

Replies to Mr. Hutchinson's Questions.

By ARTHUR POWELL, B.A., M.CH.

To those who have a practical acquaintance with the disease, Yaws, the above query may seem absurd and the arguments adduced below as the thrashing of a dead horse.

Yet the President of the International Congress of Dermatology, whom we all recognise, not merely in virtue of his office but from his valuable work, as the leading authority on syphilis and diseases of the skin, has, after years of consideration, declared—"My contention is clear and definite to the effect that there is no such disease as yaws, and that the phenomena which have received that name are simply those of syphilis modified by race, climate, and by erratic modes of infection." (n.)

In elucidating this question three methods of enquiry are open:—

1st.—Personal observation of clinical facts.

2nd.—Study of the written accounts of modern surgeons and physicians.

3rd.—Antiquarian research concerning obsolete diseases, such as Sibbens, Button Scurvy, Morula, Framboesia Cromwelliana and the like.

Mr. Hutchinson's geographical situation unfortunately debars him from obtaining the first class of evidence,—the only evidence acceptable in a law court.

In the second class we must be careful to discriminate those cases in which the writer describes his personal observations on yaws, from those where he relates the fact that certain illiterate savages describe under the one name, "koko," "yaws," "paranghi," or "kwe-na" any unsightly eruption such as syphilis, leprosy, yaws or lupus.

No doubt Macaulay's New Zealander will write an instructive paper on "Tetter" as it occurred in Britain.

The antiquarian method is of more interest to the enrious, than value to the practical surgeon. Here we must take into consideration the confusion with regard to syphilis before Ricord's day—sixty years ago. When it was taught that secondary and tertiary symptoms were as frequent results of gonorrhoea and the soft sore as of syphilis, yaws was unlikely to escape the general confusion.

Whether Sibbens, Framboesia Cromwelliana and Morula were syphilis or yaws is quite beyond the power or inclination of the writer, or the scope of this paper to discuss. Nor is the argument overweighted with logic that because the surgeon-barbers of 1650 were unable to recognise syphilis, therefore, the colonial surgeons of 1897 are in a similar state of ignorance.

Sir W. Kynsey having expressed the purely academic opinion that these diseases were "similar to yaws," Mr. Hutchinson triumphantly rejoins, "button scurvy, sibbens and radesyge are now generally acknowledged to have been names for syphilis," and so Sir William's opinion is taken as a strong argument in favour of the identity of yaws with syphilis.

Mr. Hutchinson's evidence of the second class is chiefly derived from the report of Dr. Numa Rat. In his preface to that work Mr. Hutchinson says: "By yaws we understand a disease which begins by a local sore, becomes constitutional, observes stages, and has both secondary and tertiary phenomena, *having assumed these facts as established* . . ." (a).

This assumption is, I fear, scarcely warranted, as most observers deny—

1. The necessity of a primary sore.
2. The existence of tertiary sequelae.

Let us examine the evidence on these points.

The primary sore.—Dr. Rat (a) describes the primary sore as a papule which results in "an ulcer with perpendicular edges and a clean base."

Here I must contrast the value of Dr. Rat's records with the observations of Charlouis, Paulet and myself.

Charlouis (c) deliberately inoculated 49 persons, with ten failures. The primary symptom in all 39 successful cases was a papule which developed into a raised granuloma.

Paulet (b) inoculated 14 persons. In four there was no lesion at the site of inoculation, but a general eruption ensued. A papule which developed into a convex nipple-shaped granuloma, appeared at the site of inoculation in the other ten cases.

Nicholls inoculated 8 cases successfully. In three, a general eruption ensued, the site of inoculation remaining healthy. In the other five a papule developed and became a granuloma undistinguishable from the general eruption.

In 1890, yaws broke out as a new disease hitherto unknown in my own district (Cachar), and as such excited interest not only in my assistants and myself, but also among the coolies who quickly noted its inoculability.

The great majority of my yaws patients are indentured coolies or their children, and are paraded every morning before going to work, obtaining leave or being sent to hospital.

They are daily inspected by a native medical man who has charge of a population averaging about 500.

In Degubber, where over 50 cases occurred, my assistant, Munshi Ellim Mia, showed exceptional energy and intelligence in daily inspecting all members of any household in which an individual was attacked.

All scratches, wounds, ulcers, leech-bites, etc., were noted in the expectation, which was usually fulfilled, that the disease would be there inoculated.

In no case did any ulcer as described by Rat appear. In many cases a general eruption was the first symptom, the presumed site of inoculation remaining healthy; sometimes a number of granulomata appeared in the neighbourhood of the wound or sore before becoming general. In the majority of the cases a papule which developed into a granuloma at the site of inoculation, preceded a general eruption of precisely similar lesions.

In some cases the general eruption developed *pari passu* with a similar granuloma at the site of inoculation.

Let us contrast these cases, over two hundred in number, with Dr. Rat's records, only two "illustrating the initial lesion."

Dr. Rat's "case I, present disease, dermatitis of the sole."

Under the heading "*Previous History*" the primary lesion is described as "a small papule, the summit of which filled with a white fluid about a week after its appearance. It then ulcerated and formed a small sore which lasted about two months."

The "present disease," for which Dr. Rat saw the case, commenced *a year and six months* from the beginning of the yaws.

Now as the initial lesion is described as "Previous History," and Dr. Rat states in his essays that he had only "more than a year's residence in the district," it is evident that this is not his own personal *observation*.

Case II, seen by Dr. Rat in July 1890. The initial lesion so accurately described occurred in September 1881, nine years before coming under observation.

Surely some better positive evidence of this initial ulcer, than an account of the recollections of two untrained negro observers, is required to overthrow the evidence of Nicholls, Charlouis, Paulet, John Hunter, myself and a host of others.

Even assuming the statements of these negroes as accurate, is it not more reasonable to regard these ulcers as merely the breach of surface which gave entrance to the virus of yaws, than as lesions caused by that poison?

We do not regard the spot of herpes or simple abrasion of the prepuce, which gets infected with syphilis as a primary stage of that disease.

It is possible for the casual observer when a papule is about to ripen into a granuloma, to mistake for a pustule the yellow top of granulation tissue showing through the thinned horny layer, but further observation will always prevent such an error.

Consulting dermatologists are well aware how inaccurate even the general practitioner is in his description of an eruption. We cannot attach more value to the diagnosis of an untrained cooly or negro.

Besides the evidence against the existence of an initial ulcer given above, I may add that John Hunter (s), Macgregor (aa) and Squire make no mention of it. Inray (d) denies its existence, Prout (y) says: "Any lesion at the point of entrance may be entirely absent, and even if it does occur, can hardly be regarded as a characteristic primary sore."

The alleged tertiary stage.—Since last I wrote on this subject another year has passed by, and I have still the same report to make that not one of my cases has suffered from any tertiary sequelæ. With the exception of a few absconders, and of four deceased from other causes, all are still under daily observation.

It is worthy of note that almost all writers who describe this stage say it is most frequent in those who have also suffered from syphilis, scrofula or leprosy, and add that it is difficult to distinguish from the lesions of these diseases.

Bowerbank (d) says: "In persons predisposed to leprosy, syphilis, scrofula, etc., when attacked by yaws its course is often irregular and protracted, . . . till at last the latent disease becomes roused into action, and a most destructive ulcerative process takes place."

Here it is to be observed Bowerbank properly considers the ulceration the result not of yaws, but of the complicating diathesis, yet he is quoted in support of the tertiary stage of yaws.

Most surgeons have met cases of quiescent leprosy, and tubercle, or latent syphilis, in which malaria, enteric or semi-starvation has roused the sleeping virus to excite ulceration, destructive of fingers, toes, palate, etc., yet we call the lesion, not malarial or enteric, but leprosy, tubercular or syphilitic as the case may be.

It is to be observed that French writers avoid the word tubercle in describing the eruption of yaws, and frequently use the word "ulcère," but there is no mistaking the "ulcères, convexes mamelonnés, baveux" or the "boutons" of Paulet or "ulcères saillies, en bourrelet" of Rochas, for anything but raised granulomata (ff).

Sir. W. Kynsey (e) says, the natives of Ceylon call by one name "paranghi" two diseases, frambœsia and lupus. If lupus succeeds yaws in the same patient he does not regard it as a stage of the latter disease, but, "feeble individuals or feeble parts of an individual are most readily invaded by parasitic fungi . . . as it has less resisting power. The skin after frambœsia is in this state, and would be easily attacked by the tubercular bacillus."

An attack of measles or whooping-cough is often the predisposing cause of a tubercular infection, yet the physician does not call the evidences of tubercle "the tertiary stage of measles."

Nicholls (j) whose experience must be unequalled, both from his own practice and his opportunities of seeing cases, and hearing the opinions of others, while conducting the Government enquiry in the West Indies, "unhesitatingly" declares he has never seen such a thing as a yaws 'gumma' and does not believe in the existence of a tertiary stage.

Hirsch (w) says, yaws "leaves no liability to subsequent or tertiary phenomena."

Whilst I record the plain fact that I have never seen any ulceration or "tertiary" symptom follow yaws, and hold that the writings of others do not justify a belief in such a tertiary stage, I must not be interpreted as saying that he who has once had yaws is thereafter immune to ulceration of any kind!

We must remember that those suffering from ulcers are very liable to inoculation, and that in the tropics intractable ulcers are extremely common, quite independently of such dyscrasia as syphilis, tubercle, leprosy or yaws.

The writings of Hunter (s), Lemprière (u), and others contain ample evidence on this subject.

In the Manager's Report on the Loobacherra Tea Estate for 1896, it is stated that at times 25 per cent. of a labour force of 1,500 were in hospital with ulcers of the feet and legs.

It is to be remarked that those who describe second, third, and even fifth attacks of yaws—usually on the faith of their patients' statements—are also the describers of tertiary nodes and ulcers due to yaws. The experience of most surgeons and the traditions of all races liable to

yaws are that one attack affords considerable immunity, and that second and third attacks are as rare as in small-pox, syphilis and the exanthemata

Is it not more in accord with our knowledge of disease generally to assume that one of these alleged third, fourth, or fifth attacks was really an attack of syphilis, of which the nodes and ulcers were the sequelæ?

The following quotations from his own writings are almost sufficient to prove the non-existence of what Dr. Rat calls the "tertiary stage,—that of deep-seated lesions, such as exedent ulcers, periostitis, gummata, etc." (a)

"The ulceration and constitutional state induced by yaws, are, in many cases, so very similar to those which result from scrofula, that the former in its later manifestations, may be mistaken for the latter, but the disease of the glands which is generally present in scrofula is usually absent in the other affection. In some cases the two diseases may be found co-existent."

If this be intended to apply to lupus, Rat's experience is uncommon and differs from mine. Pye-Smith, speaking of enlargement of the glands in lupus, says: "I doubt whether the occurrence is more frequent than mere coincidence would explain." (g)

Syphilis and scrofula are common in the West Indies. Dr. Rat saw cases of tertiary syphilitic dermatitis, "and others of destructive ulceration of the nose and throat, which in their early stages *could not be distinguished from yaws and lupus*, but subsequently revealed their true character," viz., tertiary syphilis.

Dr. Rat gives seven cases "illustrating gummata or tertiary stage of yaws" and the impression all seven give is that a little longer observation or more correct "previous history" would have "subsequently revealed their true character" as tertiary syphilis.

The fallacies common to all these cases are that:—

(1) In none did Dr. Rat observe the primary eruption personally.

(2) The evidence of a previous attack of yaws is only the recollection of the patient after a lapse of 12 to 31 years, of an attack in childhood.

(3) The possibility of an attack of syphilis has not been definitely excluded.

Dr. Rat's Case V.—Ulceration and destruction of soft palate at age of 18. Alleged attack of yaws at 5.

Case VI.—To illustrate gummata, "present disease," "skin of leg ulcerated at certain parts and at others hypertrophied and scaly, and marked with keloid-like cicatrices."

Had yaws at 16—fourteen years previously, limited to legs below the knee, followed in two years by nodules which ulcerated.

The diagnosis of the primary disease here was evidently only made by the patient, a negress.

Case VII.—Present disease, ulcers of leg, negro aged 25. "Had yaws as a child."

Case VII.—Present disease, ulcers of leg, aged 28. "Had yaws when 10 years old."

Case XII.—Carib woman, aged 35. "Yaws gummata on extensor surface of arms and legs." Had yaws 31 years ago when aged 4.

Case XIII.—Had gummata at 25. Alleged yaws at 13.

Case XIV.—Age not mentioned. "Had yaws as a child."

In all these cases the "previous histories" seem based on the diagnosis of negro children and are of too legendary a character to base scientific conclusions upon.

In all the *post hoc, propter hoc* line of argument would equally well prove these symptoms to be tertiary manifestations of an antecedent attack of measles or flea-bites.

Mankind is much the same in London as in Dominica. All the world over patients suffering from tertiary syphilis withhold more often than they volunteer an account of a chancre or secondary eruption.

As the Cockney naïvely offers as a possible cause, the familiar "dirty water-closet," so the negro finds it less humiliating to allege an attack of yaws in infancy, than to admit his disease is the result of illicit intercourse.

Dr. Rat describes "a severe form of this ulceration which resembles that of exedent lupus," which may come on twenty years after the "secondary" symptoms.

"As they generally occur in the scrofulous, they usually present the appearances common to that disease." Again he says, the ulcers on cheeks, lips, etc., "generally occur in the scrofulous."

I leave it to my readers to decide whether an ulceration resembling exedent lupus, occurring in a scrofulous patient, and presenting the appearances of that disease, should not be more logically diagnosed as lupus or scrofula, than as a late manifestation of a disease which occurred, and was apparently cured twelve, twenty or thirty years previously!

Let us for the moment assume that Dr. Rat's tertiary patients gave honest accounts of their previous history. West Indian surgeons complain that the negroes take little note of the yaws eruption and can with difficulty be persuaded to enter hospital.

The man who takes no trouble about so loathsome a disease as yaws is unlikely to make a mental note or record of so trivial-seeming a sore as a single hard chancre.

The European planter, as a rule, has a slight knowledge of medicine, and is at least a keen observer. That the planter did not frequently observe tertiary sequelæ after yaws is evident, for in the days of slavery he always paid an enhanced price for a slave who had suffered from a yaws eruption.

Few colonels would prefer a regiment of men who had suffered from secondary syphilis.

Replies to Mr. Hutchinson's Questions.

To decide the controversy as to the identity of yaws with syphilis, in his preface to Dr. Rat's report, Mr. Hutchinson asked for answers to a number of questions.

I here answer them as far as my experience enables me.

Question.—Does yaws ever occur in Europeans? And if so, does it show any differences from the disease as seen in Africans?

Answer.—John Hunter (s) says: "Yaws is not peculiar to negroes, for several of the soldiers were affected."

Living describes a case of a European (h). In reply to Dr. Nicholls' (j) enquiries Dr. Tulloch (j) of Tobago says: "I have never seen it in a white person, . . . but have seen it in at least three families who might pass for whites and are in 'society.'"

Dr. Latour (j) writes: "Have known a European affected."

Dr. Hatton (j): "I have seen well-to-do white people suffering from the disease."

Dr. Newsam (j): "Cases are met with among the whites, Barbadians and Portuguese."

Dr. O'Carroll (j): "Knew several members of a respectable white family to be attacked."

Dr. Pierrez (j): "I have not had more than three or four" white cases.

Dr. Branch (j): "It is rare among the whites."

Dr. Rat (j): "The whites are rarely attacked in comparison with the negroes."

Dr. Mapleton (j) has seen it in a white child. Desportes (i), Bancroft (o), Winterbottom (p), Chisholm (q), Williamson (r), Moseley (t), Leprieux (u), (all the soldiers in one ward.)

Anthonsz (v), Dancer (cc), Thomas (bb), Maxwell (dd), Robertson (ee), Bowerbank (n), Daniels (x), Orgias (j), Nicholls (j), and Charlois (c) describe European cases. Macgregor mentions "several white persons" (ac.)

All my cases were Aryan coolies; none were negroes. Nolan (k) describes the disease among the Burmese. The Ceylon cases are Cingalese, Moors and Tamils. In Fiji both Polynesians and Asiatic coolies are attacked. Rochas says it is frequent among the Chinese (ff).

In the West Indies half-castes, Caribs and Asiatic coolies are frequently affected. All the photographs exhibited from the West Indies at the last International Congress of Dermatology were of coolies.

Bowerbank (d) has seen the disease in a Chinaman, Charlois in two Europeans, a Chinaman and several Javanese and Malays.

There does not seem to be any difference in the disease as it occurs in different races. Bancroft found the disease more severe in whites. The duration of the eruption in my cases seems longer than the average in the West Indies.

I have observed that in dark-skinned coolies the site of the healed granuloma is marked by a dark macula of pigment. In the fairer coolies the macula is paler than the surrounding skin.

Question.—What are the statistics as to the frequency of syphilis in districts where yaws is common? Are the two diseases in inverse ratio of frequency?

Answer.—Syphilis is very frequent in my district, as over India generally. The Army Medical Reports are sufficient evidence to its prevalence.

Dr. Carleton (z) estimates that around Simla 95 per cent. of the inhabitants have suffered from syphilis. In 1896 3,149 cases of primary and secondary syphilis were treated in the Government Dispensaries of Assam (hh).

Of my European patients 20 per cent. have contracted syphilis in India. I consider the proportion much higher among the natives.

Nicholls (j) says: "Syphilis is and has been for generations existent in all the West India Islands, and in some of them it now prevails extensively." In Ceylon it is frequent.

There does not seem therefore to be any inverse ratio.

The statement that syphilis does not exist in Fiji where yaws is prevalent is certainly exaggerated, for I have had a patient with syphilis which he said he contracted in Fiji. Furthermore there is a complaint in the Wesleyan Missionary Magazine, 1895, that the natives are being decimated in the ports of Fiji as the result of "drink and immorality"—which I take to mean syphilis.

Whitaker's Almanack, 1897, gives the population of Fiji as 101,316 natives, 9,861 Indian immigrants, 2,872 Europeans, besides Polynesians, half-castes, and Chinese. With my knowledge of the Indian coolie, and the roving European emigrant, I should need a very large pinch of salt indeed, to flavour a statement that there was not a taint of syphilis in a single one of these 12,733 immigrants. The "half-castes" of Whitaker are as eloquent as the missionaries in testifying to the intercourse of the immigrant with the native.

Question.—Do well-marked examples of inherited syphilis occur frequently in the yaws districts?

Answer.—In this district very much more frequently than in my experience of Europe.

Abortions are extremely common,—much more frequent than births at term. I attribute a large number of these abortions to syphilis.

Question.—Are infants who have suffered from inherited syphilis liable to contract yaws?

Answer.—Those suffering from ulceration or breach of surface, syphilitic or otherwise, are specially liable to inoculation.

Dr. Rat quotes a case where a child suffering from syphilitic ulcers on the buttocks, was there inoculated by its nurse who was suffering from yaws. (j)

I record now the following case. G., f., æt. 14, developed yaws on the site of an abscess. Three of her playmates were suffering from yaws. On 2nd September, 1896, she was first admitted to hospital by my *locum tenens* with a copious general eruption of granulomata which remains to the present day. This girl had been operated on by me in 1890 for cleft palate and hare-lip. I find, on reference to notes then made, that I regarded her as a case of hereditary syphilis. "White streaks radiating from the angles of the mouth, sunken nose, teeth irregular but scarcely characteristic."

Her father had been treated by me for nodes and tertiary ulcers. He was quite blind from occlusion of the pupils caused by iritis in 1882.

Question.—Are there many cases in which it is impossible to decide whether the symptoms are due to syphilis or to yaws?

Answer.—I have never seen such. There is no disease,—not even small-pox,—more definite in its appearances than yaws.

I cannot think it possible for one who has seen other cases to mistake the eruption, unless there be but one or two spots near the anus which might be mistaken for a condyloma or mucous patch.

[In Vol. VII, p. 363, Archives of Surgery, Mr. Hutchinson takes me to task for this answer. "Yet he" (Powell) "thinks that an observer so able as Dr. Rat did describe as yaws what was really syphilis."]

I am sure Dr. Rat could never mistake the eruption of yaws for that of syphilis. My contention with Dr. Rat is that he attributes certain sequelæ to yaws at intervals of 12 to 31 years, from an alleged attack of that disease, and takes an absence of syphilitic taint for granted.

Question.—Are differences of diagnosis on this point common amongst medical men?

Answer.—Not in the yaws districts. A man unacquainted with the literature and appearance of yaws, or believing that yaws is confined to the negro race and non-existent in his district, will probably, on seeing his first case, diagnose syphilis on the principle "*in dubio suspice lues*."

Question.—If a woman, the subject of yaws, in an early stage, say within a year of contracting it, become pregnant, what is the result to her foetus?

Do recently infected women ever bear healthy children?

Answer.—I think we may safely say that the foetus is never affected by yaws. Nicholls, Tulloch, Garvin, Kynsey, Rankine, Mason, Maxwell, Bowerbank, Rat, and most modern observers of large experience hold that yaws is neither congenital nor hereditary. My experience is the same.

To the latter part of the question I answer yes. I have never seen a child born unhealthy, or become so, within nine months of its birth.

Dr. Nicholls' reports: "There have been altogether 10 births in the hospitals, and in no instance were congenital or later hereditary symptoms manifested, although the mothers were suffering from yaws at the births of their children. In one case the child was born at the eighth month, and it died the day after birth; but in the other nine instances, birth took place at the full term, and the infants were strong and healthy, and they thrived well during the time, extending over twelve months, they were under observation." (j)

He quotes a similar patient of Dr. Rat's who was perfectly healthy more than a year after its birth.

Of my own patients, case 51, K., æt. 17, was first attacked by yaws in May, 1895, and when first seen by me, July 7th, 1895, had one of the most copious eruptions I have ever seen.

On January 14th, 1896, when quite cured, she was delivered of a healthy boy, who has remained in perfect health to this day (September 3rd, 1897).

Case 6, S., æt. 37, was delivered of a healthy child within a year of the eruption. It is still robust.

The wife of Case 10, S., was delivered of a child (which remains healthy to this day) in February, 1895, five months after the eruption disappeared from S.

The wife of B., case 27, conceived six months after B's eruption began. The child was born in June 1893, quite healthy, and remains so still. B's eruption continued till February, 1894.

Case 103, R., f., aged 20, yaws began in January 1895. A healthy girl was born, 24th February 1896. The child remained perfectly healthy till last seen in March 1897, when the mother eloped with her. A few granulomata still remained on R's thighs in Scarpa's triangle. The husband had become inoculated by the wife and was such a loathsome sight that R abandoned him. None of the above cases had ever been treated with mercury or iodine.

Case 48, R., was first attacked in February 1895. An eruption began on her husband 27th July 1895. On April 15th, 1896—fourteen months after yaws began—she was delivered of a healthy child. This child continued in perfect health till, in December 1896, both he and R. developed itch. This was cured by sulphur, but on January 20th, 1897, yaws granulomata were observed commencing on the front of the right wrist where the itch had been. In April the yaws eruption was general. In May the child got bad with high fever, and when I saw it in May 1897 the yaws eruption had disappeared, but the child was very ill. Broncho-pneumonia set in, and the child died on June 12th. I very much regret I could not perform a *post-mortem* examination, as that afternoon an earthquake cut off all communication by destroying the roads and bridges. The

father and mother are still suffering from copious eruptions of yaws.

None of my patients, or the wives of patients, have had any abortion or given birth to any child but the six above-mentioned.

Question.—*What are the peculiarities of syphilis in the dark races?*

Answer.—I have found it much the same as in Europeans. Among coolies well-fed and living a healthy out-door life, tertiaries are rarer and the disease less severe than in European townfolk.

Among "purdah" women, who never take any out-door exercise, in starved coolies, and in hereditary cases generally, the tertiary symptoms are severe and common.

Question.—*Is a well indurated chancre often seen?*

Answer.—The proportion of chancres shewn by patients is small, but the number is as great as in European practice. They are often typically indurated.

Question.—*Do bullet buboes occur?*

Answer.—When the chancre is indurated the glands are almost always markedly indurated. This symptom is more prominent in India, as scrofula being uncommon, the groins of healthy individuals are "cleaner," or less marked by glands of doubtful size and induration than in Europeans free from syphilis.

Question.—*In cases of tertiary symptoms from supposed yaws, such for instance, as ulcerations of the palate, is it often the fact that syphilis can with confidence be excluded?*

May not cases such as those on pp. 38 and 39 (of Rat's report, cases V and VI mentioned above) have been instances of the co-existence of yaws with syphilitic taint?

Answer.—I have never seen any sequelæ due to yaws or anything resembling the tertiary sequelæ of syphilis in a patient who had suffered from yaws.

My reply to the second part of the question I have already given above. I should say the existence of the syphilitic taint was certain, and the history of the yaws legendary.

Question.—*How short may be the interval between a well-marked attack of yaws and one of syphilis?*

Answer.—There may be no interval. My cases 35 and 41 developed typical indurated chancres with induration of the glands, followed by symmetrical ulcers on the tonsils, and a maculo-roseolar rash whilst suffering from a copious eruption of yaws of four and six months' duration respectively. In both the syphilis rapidly gave way to mercury, but in case 35 the yaws lasted for two years till his death from dysentery. The yaws also lasted two years in case 41.

Charlouis (c) inoculated on May 3rd, with syphilitic virus on the right breast, a patient then suffering from yaws. On June 1st, a hard

chancre developed, and in 3½ months he had a general syphilitic eruption, the yaws remaining unchanged.

He quotes another patient who, while suffering from yaws, contracted a penile chancre in coitus. In nine weeks a maculo-papular eruption with plaques in the mouth and around the anus developed.

Dr. Kirkpatrick (j) records a case where syphilis was contracted three years after an attack of yaws.

Dr. Boyd (j) records a case where yaws appeared a fortnight after a "well-marked Hunterian chancre."

Edwards (j) has seen very characteristic yaws tubercles on chronic syphilitic ulcers.

Cases are very numerous in which syphilis has preceded yaws, less numerous in which the yaws preceded syphilis. The deduction is not to be drawn that therefore yaws protects against syphilis, which Charlouis and my own cases clearly disprove, nor that yaws is a later stage of syphilis.

It is only natural that those suffering from syphilitic or other ulcers offer many openings for the inoculation of the yaws virus.

He who is suffering from yaws presents so loathsome an appearance to the female of his species as to debar sexual intercourse,—the chief method of contracting syphilis. In the same manner the female yaws patient presents few attractions for the most erotic of our sex. Furthermore, the negro or coolie who has passed through so disgusting an eruption as yaws is not likely to seek advice for a mild scaly or roseolar eruption.

Question.—*In the secondary stage of yaws is there often any affection of the tonsils or pharynx?*

I have examined the throat in 130 cases, and except the two cases of complicating syphilis above-mentioned, have found all healthy except two children with adenoid hypertrophy in the pharynx.

With this evidence before him will any one maintain that yaws is "merely syphilis modified by race, climate, and by erratic modes of infection?"

As regards race it is amply shewn that if exposed to the contagion no race is immune.

I have above quoted thirty writers who mention cases in Europeans. The majority of these writers mention several cases.

Fijians, Polynesians, Cingalese, Moors, Tamils, Bengalies, Hindustanis (Aryan races of India), Javanese and Malays have proved fully as susceptible as negroes.

Half-castes, Caribs, Chinamen, Barbadians, Portuguese and Burmese have all suffered, so the race theory must completely collapse.

The comparative immunity of the European is no greater than we should expect. Even in the hottest climates, his body and legs are com-

pletely clothed, his feet shod. He sleeps at night under a mosquito net to prevent the bites of insects. Especially in the tropics, even trivial wounds and sores are dressed and bandaged. He looks with loathing on leprosy, yaws and all foul sores. From his youth he has been taught to avoid contact with them.

On the other hand, the negro and the coolie, as a rule, wear only a loin-cloth. Three-fourths of my yaws patients are coolie children whose fullest uniform consists in a cowrie shell tied round the waist with a string.

Wounds and ulcers are left open to take care of themselves. Let the London surgeon walk into the compound of an Indian hospital while the patients are waiting for admission. He will see through a nebula of buzzing flies, nine-tenths of the wounds and ulcers open, the patient gently fanning off the flies. As the pus accumulates he scoops it up with his finger, and wipes the latter "clean" on the ground where hundreds have done the same before him.

Perhaps a woman in friendly gossip, seeing some secretion about to run off her neighbour's sore, will perform the same kindly office, or will pause to trap an unwary maggot which has incautiously protruded its head from a sinus.

Let the surgeon then visit a coolie hut ten or twelve feet square, during a sultry night.

Lying on the mud and cow-dung floor for its extra coolness, he will find half-a-dozen children stark naked, with papa and mamma almost so, literally stewing in the sweat of the family which trickles in streams over the mass of huddled limbs, carrying with it any secretions or microbes which may be present.

My London friend will then be no longer unable to account for the comparatively few cases among Europeans. For similar reasons, I believe the European enjoys a similar comparative immunity to such inoculable diseases as pyæmia, tetanus and plague, which find such numerous victims in unclothed races, who pay little attention to sores.

Climate can have little to do with this assumed modification. Such various climes as the West Indies, Ceylon, South America, Fiji, West Africa, Assam, Eastern Archipelago, and the Pacific Islands have suffered. All these races and climates (I will except Fiji in deference to Mr. Hutchinson) have suffered from the European type of syphilis at the same time, side by side with yaws, and yet no one has been able to trace any intermediate stages in this abrupt "modification."

In Cachar syphilis existed for years with no distinguishing feature from the disease in other lands.

A solitary case of contagious granuloma breaks out, and in seven houses 51 out of 145 inhabitants are quickly affected, the skin erup-

tion in all cases "breeding true." The contagion is carried to other villages, but in every single case I have perfect evidence of the disease being brought by an individual from the original focus. Syphilis still continues to pursue the even tenor of its way, never once, as far as I can ascertain from enquiries or observation among a population of $2\frac{1}{2}$ millions, breeding a granulomatous "sport."

How can Mr. Hutchinson reconcile his belief that yaws is syphilis "modified by race, climate and locality" with the statement on page 26 of his classical work on syphilis?

"I do not know that any other conjecture can be given in explanation of the differences in the eruption which attends syphilis than that they depend on the idiosyncrasy of the patient. They *certainly have nothing to do with differences in the poison, for, so far as we know, none such exist. The different types of syphilitic eruption never prevail epidemically, but as it were, quite by accident. The rare ones are equally rare, and the common ones equally common at all times and in all places.*"

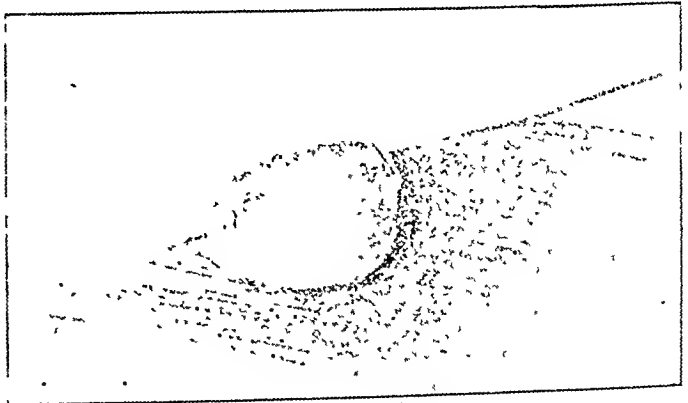
Yet in this "modification of syphilis" of Mr. Hutchinson's which I call yaws, we have a poison which will as certainly produce a framboesoid eruption of granulomata and can produce nothing else, as the virus of small-pox will produce a varioloid eruption.

If any one will produce the *corpus vile*, I will guarantee to produce the "erratic."

On the subject of "erratic" in the same work, at page 515, Mr. Hutchinson says: "Erratic chaneres differ very greatly in the conditions which they create; it may, however, I think, be asserted that they *never become warty.*"

Yet, in all my cases of yaws, in those of Charlonis, Paulet and Nicholls, the initial lesion,—the "erratic chanere" was invariably a granulopapilloma, frequently quite warty in appearance.

I have seen several erratic syphilitic chancres in the same coolie race, in the same Cachar



GRANULOMA OF YAWS.

climate that supplied my yaws patients, I have seen one on the tongue, one on the eyelid, one at root of penis, one on recent tattoo mark on

arm, two on fingers, one (?) on the cheek, and five as the result of vaccination, a total of eleven or twelve. Not one of them in any way resembled or was followed by yaws. Some of them, but for the colour of the skin, might have passed for the originals of Mr. Hutchinson's plates. None of them were warty.

As many junior members of the profession find a likeness in rupia to yaws I, at the risk of being tedious, tabulate certain points in their respective diagnoses, with some remarks on tubercular syphilide, and "framboesia syphilitica."

RUPIA.

1. Is a late secondary symptom, preceded and accompanied by other syphilitic symptoms.
2. Begins as a vesicle or bulla.
3. Is a *loss of tissue*, a more or less *deep ulcer*, covered by a thick laminated *scab*, which projects above the surface, but which when knocked off exposes the ulcer.
4. Leaves an indelible scar.
5. Patient usually cachectic.

YAWS.

1. The eruption is the beginning, the middle and the end—the whole of the disease in most cases.
2. Begins as a solid papule, and is never hollow.
3. Is a new growth. A granuloma, or lump of "proud flesh," raised above the surface. The scab is usually thin; is not a characteristic and may be thick or absent. When removed the "yaw" still remains above the surface.
4. Leaves a pigmented macule, which disappears in time without scarring.
5. Patient in usual health.

Tubercular syphilide also is a late manifestation. It also leaves a permanent scar. Being a gumma of the skin, its discharge was till lately universally believed to be innocuous. The discharge of yaws, on the other hand, is highly contagious, the only material by which the disease is propagated.

The few cases that have been described as "framboesia syphilitica," all began on the mucous membranes with an initial bullous stage,—the term "Pemphigus vegetans" being a synonym. It runs a rapid and usually fatal course, has an initial chancre with glandular and throat affections.

It has been acquired from the subject of ordinary benign syphilis, and its poison would probably only produce an attack of mild syphilis if inoculated on a healthy individual.

A few cases of a yaw-like eruption in syphilis have been described (Hutchinson, Petrini), and from this it is argued that yaws must be identical with syphilis. There are few cutaneous lesions that syphilis does not mimic. Cases of varioloid syphilis have been mistaken by eminent physicians for small-pox. Yet no one maintains on this evidence that small-pox is only a modification of syphilis.

Tabular Differential Diagnosis of

SYPHILIS.

1. A *primary stage* is almost always present as the initial ulcer or chancre.
2. Lymphatic glands usually enlarged and indurated.

YAWS.

1. A *primary stage* frequently absent. The first lesion always a granuloma similar in all respects to the subsequent eruption.
2. Glands normal except occasionally from septic absorption.

Tabular Differential Diagnosis of—(contd.)

SYPHILIS.

3. A secondary stage marked by cutaneous eruption sets in usually two to three months after inoculation.
4. The eruption is usually polymorphic, and varies greatly, may be roscolar, papular, varioloid, scaly, etc. Is very rarely granulomatous.
5. As a rule, the secondary eruption lasts only four or five months. Most patients are free from secondary symptoms six months after inoculation. Eruption often intermittent in duration. Usually symmetrical.
6. The discharges of syphilis seldom contain their contagion after a couple of years.
7. The cutaneous eruption is usually accompanied by lesions of the mouth and pharynx, "sore throat," induration of the glands, and frequently alopecia, iritis, etc. Condylomata are limited to the junction of skin and mucous membrane, or sweat-soddened portions of the skin.
8. Unless complicated, the initial chancre usually disappears, with the onset of the secondary symptoms, or at least is usually the first symptom to disappear.

9. Is liable to tertiary sequelae.
10. Is usually transmitted by the parent in the eruption stage. A very large proportion of such offspring develop symptoms within a few weeks of birth.

Should a child of such parents present no symptoms, he would, I believe, prove immune to syphilis,—a corollary, as it were, to Colles' law.

11. Contagion is, on the whole, rare compared with the frequency of exposure to possible inoculation.

Mr. Hutchinson has drawn attention to the rarity of chancres on surgeons' fingers, and estimates that not once in a hundred acts of coition with syphilitic partners is a chancre contracted,—this notwithstanding that any virus present is well rubbed in.

12. Most common when the sexual functions are active in early adult life, or, hereditarily, in children three weeks to eight months old.

13. Symptoms usually aggravated by malaria or other febrile diseases.

14. An attack of yaws confers no immunity to syphilis.

15. Syphilis in infants is when untreated a very fatal disease—in coloured races at east.

YAWS.

3. The general eruption frequently appears in three or four weeks after inoculation, Nicholls describes a case in which a general eruption came out 16 days after inoculation.

4. The eruption is invariably a granuloma or papilloma, or the abortive stage of the granuloma.

5. The eruption lasts from three months to over six years. It is seldom cured in less than a year. The average duration of my cases is 26 months. Eruption not marked by symmetry in many cases.

6. As long as yaws lasts its discharges are inoculable. My case 58, B, was inoculated with discharge from a case that had existed three years. Case 110 most probably from a case of 4 years, 3 months' duration.

7. Never presents these phenomena.—

Granulomata near the anus may resemble the mucous tubercles, and condylomata of syphilis, but they are identical with the eruption elsewhere on the skin.

8. Frequently the yaw first to appear at the site of inoculation is the last to heal, and sometimes by its obstinacy earns the title of "Mother-yaw," surviving all the other granulomata.

9. I and many other observers have never seen any such.

10. Is never hereditary or congenital. No case has been published. On the contrary, dozens of children born while their parents were affected, have remained healthy for years.

Such children possess no immunity to yaws, and may be subsequently inoculated.

11. The virus is most active. It is quite the exception for one suffering from a wound or ulcer in the same house with a yaws patient to escape that disease.

12. Most common from 2 to 12 years of age. The earliest age at which I have known yaws begin is 9 months. Of Tulloch's 329 cases the youngest was 11 months.

13. Pyrexia seems almost always to have a curative effect.

14. An attack of syphilis confers no immunity to yaws.

15. Disappears spontaneously. The health is but little affected, children pursuing their games just as in health.

Tabular Differential Diagnosis of—(contd.)

SYPHILIS.

YAWS.

16. Is in my experience very amenable to treatment with mercury and the iodides.

17. When transmitted to the fœtus, frequently causes abortion, and syphilitic disease in the child shortly after birth.

18. Cannot be inoculated on fowls.

16. Is in my experience most intractable and derives little benefit from mercury or iodides. This does not seem to be the experience of other surgeons.

17. Has no such effect on the fœtus. Never causes abortion.

18. It is said to be transmissible to fowls. (?)*

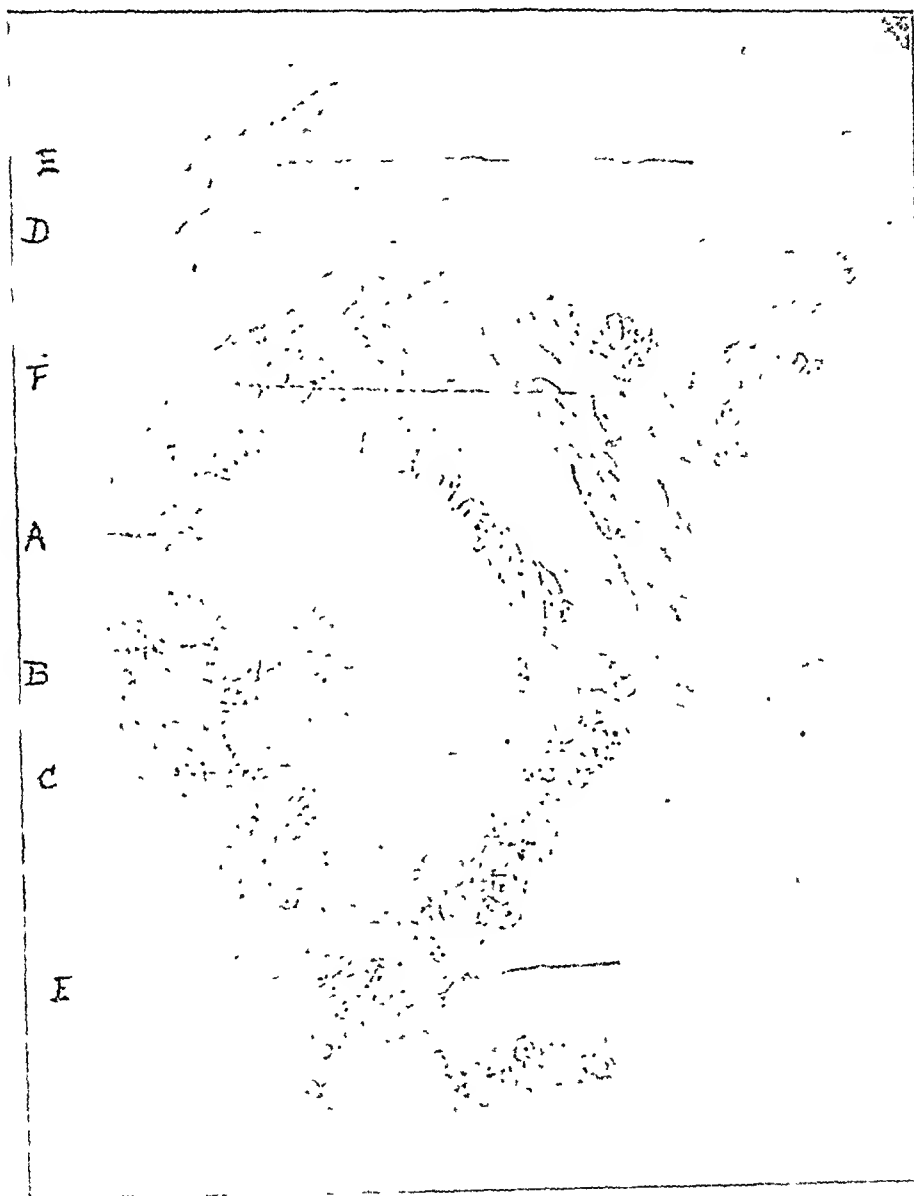
Tabular Differential Diagnosis of—(contd.)

SYPHILIS.

YAWS.

19. No microbe is recognised as characteristic of syphilis.

19. A micrococcus is invariably, and a yeast occasionally, found by the writer. The coccus has been found by all other experimenters. Hirsch claims to have produced typical yaws in a fowl from a culture of this coccus (*gg*). Nothing resembling the bacillus of Lustgarten has been found.



YAWS.—Section of Granuloma, showing:—

- A. Papilla of granulation, tissue surrounded by
- B. Interpapillary layer of epidermis, rete Malpighii.
- C. Blood vessels.
- D. Stratum corneum, with micrococci near surface.
- E. Granulation tissue.
- F. Ditto making its way between, and separating the layers of epidermis.

* I have never succeeded in inoculating fowls with yaws, but, through the kindness of Mr. Targett, I obtained from the museum of the College of Surgeons some West Indian specimens labelled "Yaws in a young Turkey."

On the head and neck were a number of tubercles, varying in size from a pea to a hazelnut. I cut sections of one which I took from the eyelid.

To the naked eye it presented a white homogeneous cheesy appearance on section.

I was unable to cut good sections, as the specimens were many years old. I believe they were sent by Dr. Rat to Mr. Hutchinson, who presented them to the College.

Histologically they presented a considerable resemblance to human yaws, as the tumour was composed of long papillary processes of epithelium with a quantity of granulation tissue in the interspaces.

They were certainly not an agglomeration of insects as alleged by Thomson. There was no trace of any tick, chigoe or other insect, no eggs, and none of the oval bodies described by Nicholls.

My only apology for the length of these remarks is the urgent desire to see the disease stamped out by compulsory isolation.

Nothing but a belief in the doctrine of Mr. Hutchinson can excuse the *dolce far niente* policy of taking no measures to nip in the bud this new exotic in a land already rich in indigenous plagues.

In addressing the Dermatological Society of Great Britain and Ireland last October I said:—

"In treatment the first thing to be done is to prevent the spread of the disease to others. The patient should be isolated, and no one with an exposed wound or sore allowed to approach.

"In the West Indies the disease spread to such an extent, and caused such a large loss of labour, as well as individual and Government outlay, as to become of grave national importance. According to Bowerbank 'the coolie immigration was crippled by the ravages of the disease.' Large sums were spent on commissions of inquiry, and in building asylums for the isolation and treatment of yaws. In some of the islands laws are passed for the compulsory segregation of those attacked. With this example before us, we would urge the Government of India to take steps to prevent the spread of the disease. At present it seems but a small matter with, perhaps, a hundred cases; but we must remember that they have increased by geometrical progression in the past six years, especially since the foci of infection have become multiplied. In Bengal we have all the conditions favouring its spread. We have the same hot moist climate as the West Indies, Gold Coast, Ceylon, and Fiji, and the Bengali coolie has in the West Indies proved himself very susceptible to the disease.

"It should be an easy matter to utilize the leper asylums, which, though quite inadequate to isolate all cases of leprosy, could easily cope with the present cases of yaws. Segregation should be made legally compulsory, and all coolies returning from countries where yaws exist should be inspected both at the port of embarkation and on landing."

The present regulations for the suppression of plague give full power to deal with the matter.

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Contributors to the columns of the "Mirror of Hospital Practice" will receive twenty-five copies of their cases.

A Mirror of Hospital Practice.

FRACTURE OF PATELLA BY A SURGEON DURING FORCIBLE FLEXION.

BY ARTHUR POWELL, B.A., M.CH.

A MUSSALMANI woman, *æt.* 28, otherwise in excellent health, was admitted to hospital for stiffness ("fibrous ankylosis") of the right knee-joint caused by synovitis two years previously.

A slight amount of passive movement existed; the patella could be moved laterally, shewing no adhesion to the tibia or femur. The patient was well-proportioned, taller and stronger than most of her race.

There was no evidence of syphilis, scrofula, rickets, mollities, scurvy, malignant or other disease to account for fragility of the bone.

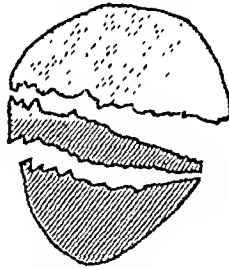
On October 1st, 1895, she was completely anaesthetised with chloroform. When the conjunctival reflex was gone, I grasped the ankle with my right hand and proceeded to bend the knee over my left elbow. There was no spasm or resistance of the muscles. The leg flexed without any great force to an angle of 130° or 140° with the usual sensation of fibrous adhesions giving way.

I then noticed a peculiar dimpling over the patella. Examination shewed that I had fractured that bone into three fragments. As shewn in the figure, an elongated central piece lay diagonally across the gape between the upper and lower fragments.

This was very clearly made out by palpation immediately after the accident, before any effusion took place.

This case seems to me unique, but it is possible that similar cases are not unfrequent, though the surgeon is too bashful to record his experience for the warning of others.

The case is the more remarkable as no pulley or apparatus of any kind was used. I am at the best of times of weak muscular development, weighing only nine stones, and on that occasion was weak with influenza.



HEPATIC ABSCESS.

H. P. ESMONDE-WHITE,
Durbar Physician, Trevandrum.

NARAGNAN, a thin weakly man, 28 years of age, was admitted into the General Hospital here, on 24th of May. For some time he had been given to drink and recently was in bad health.

On examination a prominent soft tumour was visible in the epigastric region. Hepatic abscess was diagnosed, and he was operated on. A free incision was made with the intention that, if there was no adhesion, the liver could be sutured to the abdominal walls; but very feeble adhesions had commenced, and the sac of the abscess was a thick light tough membrane. It required some force to penetrate the membranous sac. Free drainage and washing of cavity resulted in a complete recovery. The case is remarkable for the thickness of the abscess sac, and for the fact of the man's temperature being normal when he had over a pint of pus in the liver.

A CASE OF QUININE ERUPTION.

By SURGEON-CAPT. D. M. MOIR, I.M.S.

W. C. J., *æt.* 21, a German seaman, was admitted to the Presidency General Hospital, Calcutta, on the 9th April 1897, suffering from early phthisis. He evinced marked toleration for most of the drugs prescribed in his treatment, *e.g.*, by degrees he was able to take two drachms of creasote, in three doses of forty minims each, during the 24 hours. But there was marked intolerance to quinine.

On the 6th June he was ordered ten grains of sulphate of quinine thrice daily, owing to the supervention of daily pyrexia and night sweats. This seemed to have a beneficial effect on his temperature, so it was continued in spite of his protests that the medicine disagreed with him. Flushing of the face was noticed, without any special significance being attached to it. Quinine was stopped on the 17th June, at the patient's request, and as the fever had practically ceased.

On the 24th June there was a recrudescence of the febrile and other unfavourable symptoms, so he was confined to bed and given a mixture containing quinine, sulphuric acid, opium, ipecacuanha, and digitalis. He got thirty-two grains of sulphate of quinine divided into four doses during the 24 hours. By the 27th June his temperature was again normal, and he seemed much improved. Next day he vomited some milk, owing to the effects of the quinine mixture, he thought. He had very little sleep on the night of the 28th June, on account of intense itchiness of the palms and soles. Both hands and feet looked very red, and a few pin-point vesicles were visible. There was also a dull red eruption on the abdomen, which produced a burning sensation.

On the 30th June the quinine mixture was omitted, because he complained of nausea and of severe pain in the epigastrium. These symptoms all diminished, or disappeared, during the succeeding few days. But the pyrexia continued. Accordingly, on the 5th July, he was ordered quinine sulphate, grs. 10 in pills, thrice daily, because quinine had hitherto acted so well in controlling his fever. That night he

scarcely slept at all on account of the painful irritation in his hands and feet. His temperature rose to 103°F., and there was much constitutional disturbance.

On the 6th *July* it was necessary to discontinue the quinine treatment absolutely, because of the burning and prickling he experienced in his hands and feet, on which numerous vesicles and bullæ formed. His face became puffy and swollen, and the entire cutaneous surface assumed a vivid magenta hue, accompanied by great itchiness. He complained of pain in the back of his head and in his throat. The soft palate, fauces and pharynx appeared swollen and congested. The diaphoretic mixture was continued, also a Seidlitz powder in the early morning, and a lotion containing zinc, acetate of lead, lime water and glycerine was applied to large areas of the skin, with a soothing effect.

Next day he felt much easier, but vesicles continued to form on the trunk and extremities. Between the 9th and the 14th *July* his fever never reached 100°F., but the sensations of pain and cutaneous irritation continued. The vivid magenta colour of the skin altered to a dull bluish-red. By the 12th *July* the formation of bullæ ceased; but extensive areas of the skin were affected with eczema madidans and eczema exfoliativa. The nose, lips and ears became crusted with eczematous secretion, there was lachrymation and injection of the conjunctivæ, and his features were swollen and blurred. A soda lotion was substituted for the calamine one, and certain parts were dusted with boric and zinc powder, while arsenic was given internally. By the 14th *July* much of the cuticle was peeling off in branny scales, or large flakes, and off his fingers as casts. On the 15th *July* universal desquamation was in progress, so Ihle's paste was applied with good effect.

On the 19th *July* there was a recrudescence of the skin troubles, pruritus and the formation of small papules and vesicles: carbolic lotion, and later resorcin lotion, were applied. On the 24th *July* he described his subjective sensations as having changed from itching and scratching to a feeling as of nails, pins and needles being driven into the flesh of his limbs and trunk. Next day the resorcin was stopped, and an ointment containing salicylic and boric acids, zinc, glycerine and vaseline, was substituted. About the 30th *July* he developed a fresh skin trouble in the shape of boils on his body and small pustules on his hands. These were acutely painful, and gave rise to a febrile reaction which reached 102°F. Finally, about the 9th *August*, he got rid of all his skin troubles.

A fortnight later, on the 23rd *August*, when he was doing well in every way, the following control experiment was made. Half an ounce of the solution noted below was rubbed firmly on the skin of the front of the chest from the

supraclavicular spaces above, to the level of the nipples below:—

Quinina Sulphatis	...	...	3 ss
Acid. Sulphurici dil.	...	...	m. xv.
Spir. Vini Rect.	...	...	ad 3 ii.

Thus 7½ grains of quinine were applied to his chest, and evidence of the drug was apparent in the form of a fine white precipitate as the spirit evaporated.

The same night he was much disturbed by pruritus of the chest wall and a tingling in the nose.

On the 24th *August*, within 24 hours of the application, his condition was as follows:—

Bright pink blotches on the face. Anterior nares vivid red, nose swollen and pink. A large patch of pink round the right eye and extending to the nose. Eyelids swollen. The skin of the front of the chest over the area of quinine inunction was covered with a bright pink erythematous flush and a papulo-vesicular rash. The eruption has extended beyond the area of friction to the shoulders and neck (supraspinous fossæ and anterior triangles of the neck) in the form of a morbillar exanthem, and also downwards for a hand's breadth below the level of the nipples.

He complained of intense itching over the surface of the eruption, which produced an almost irresistible desire to rub or scratch the skin. A mixture containing hyoscyamus and hydrobromic acid was ordered every 6 hours. Nevertheless he scarcely slept at night, and then only for a couple of hours after a morphine draught. The pruritus of the chest and face seemed to be most severe at nights.

On the 25th *August* the whole face seemed more flushed and swollen, the eyelids were red and puffy, and the cuticle of the nose was raised by minute vesicles. The erythematous pink flush on the face, neck, and chest had altered to a more vivid, magenta-like colour, with a bluish tinge. The whole of the front of the chest was covered with innumerable vesicles, varying in size from a pin's-head to a pea, and containing clear, transparent fluid. There was a spreading margin to the periphery of the eruption, which had extended considerably. The nipples and areolæ were tender, swollen and painful. A lotion composed of boric acid and barley water had a soothing effect over the area involved.

26th *August*.—The erythema showed marked diminution in intensity over the face, neck and chest; but it had spread over the abdomen. Many of the vesicles had coalesced; but the fluid in them remained quite clear, and there was never any tendency to pus formation. The cutaneous irritability continued, necessitating a morphia draught at night to procure sleep; but the pain previously complained of was gone.

27th *August*.—The erythema has almost faded. The vesicles have mostly dried up, except in the axillæ where they are prominent, causing a good deal of discomfort.

28th August.—Fine, branny desquamation all over the neck. Face quite pale. No vesicles on the chest, the skin of which has become soft and glistening, and covered with pink spots.

29th August.—Extensive desquamation over the chest and axillæ, &c. Pruritus continued.

31st August.—The skin eruption has almost disappeared, and he has no more burning or itchy sensations.

It may be mentioned that the patient left hospital on the 24th September in greatly improved health, with the lung affection in a perfectly quiescent state.

Summary.—This case illustrates the fact that there is no tendency to acquired immunity in a patient who is afflicted with the idiosyncrasy of cutaneous intolerance to quinine.

On the first occasion, between the 6th and the 17th June, he was able to take six drachms of quinine in solution. The second time, between the 24th and 30th June, he got between 3 and 3½ drachms of quinine in a mixture; but the disagreeable symptoms manifested themselves more quickly and more forcibly. Thirdly, he was given 30 grains of quinine in pills between the 5th and the 6th July, and the exhibition of the drug was promptly followed by severe constitutional symptoms, great discomfort, and cutaneous eruptions which lasted for over a month. Lastly, after he had been free from all cutaneous symptoms for a fortnight, one external application of 7½ grains of quinine in an alcoholic solution produced a remarkable erythematous, papular, urticarial, vesicular eruption that lasted for over a week.

Remarks.—Many dermatologists and pharmacologists in Europe and America have cited instances of quinine eruptions, e.g., Dr. Prinee A. Morrow quotes cases observed by Wigglesworth, Taylor, Ringer, Briquet, Reveillod, Chevallier, Heusinger, Denk, Schuppert and several others; and Professor C. Binz refers to Vipan, Garraway, Köbner and Pflüger. But in India it would seem either that we do not see so many cases of this peculiar occasional manifestation of quinine, or that we do not record them. In my own experience, during nine years in India, this is the first undoubted case of cutaneous intolerance to quinine that I have observed. A few years ago I was shewn a mild miliary eruption on a lady's arm which was ascribed to the influence of quinine; but I saw the case on a single occasion, and I am not aware that any control experiment was made to confirm the diagnosis. Like all medical officers in India I have had ample opportunities for studying the curative and prophylactic uses of the sulphates of quinine, quinetum and cinchonidine in regiments, civil hospitals, jails and asylums, yet, this is the only case of quinine eruption of which I can speak positively. In a

paper on "Prophylaxis in Malarial Fevers," published in the *Indian Medical Gazette* for February, 1891, I gave the results of observations made with quinine and quinetum on Gurkha sepoy during several months; but in none of these cases was there any skin eruption ascribable to quinine.

During 1895 at the Presidency Jail, Calcutta, 45lbs. of cinchona febrifuge and 23lbs. of quinine were expended for curative and prophylactic purposes amongst a population of from 1,200 to 1,300 prisoners, the great majority being natives of India. During 1896 cinchonidine sulphate was largely used, 88lbs., and also quinine, 20lbs.

In the Asylums at the Presidency, Calcutta, where the inmates—chiefly natives of India—number about 275, or more, 20lbs. of cinchonidine were expended in 1896, while in the two years 1895 and 1896 over 14lbs. of quinine were used.

At the European General Hospital, Calcutta, where the patients averaged about 200, 39lbs. and 45lbs. of quinine were consumed in these two years, also 4lbs. of cinchonidine in each year, as well as small amounts of cinchona febrifuge, and also of neutral sulphate of quinine for hypodermic use. Nevertheless, in none of the institutions above enumerated was any case of quinine exanthem observed during these two years, and the same remark applies to the present year, with the exception of the case which has been described.

In a very early number of the *Indian Medical Gazette*, that for February, 1866, Dr. T. Farquhar, Private Surgeon to His Excellency the Viceroy, recorded three cases of skin eruptions following the use of quinine in small doses.

In 1862 Dr. Farquhar attended a medical officer, who had been 18 years in India, for malarial fever. The patient begged that no quinine might be given to him, because it produced "the outbreak of an eruption on the skin, intense itching all over the body, and great mental excitement. . . . At my desire, however, he rather reluctantly consented to take a small dose of only 3 grains; just as he went to bed at night. About an hour after, I was awoken by my friend galloping up to the door of my house, in his night dress, and rushing into my room in a frantic state of excitement. He declared he must die, for he could not stand the itching all over his body, and the strange sensation in his head, which, with all the features of his face felt as if swollen to twice their natural size. He had gone to bed after taking the quinine, and woke up in this state of intense distress. In half an hour the severity of the symptoms had subsided, and he went home easier."

The two other cases mentioned by Dr. Farquhar were those of an East Indian clerk and of a European officer, in both of whom the symptoms were somewhat similar.

MEMORANDA.

PERMANGANATE DISINFECTION OF VILLAGE WELLS IN EPIDEMICS OF DYSENTERY AND DIARRHŒA.

BY HAYMAN THORNHILL, M.D.,

Senior Medical Officer, Northern Province, Ceylon.

THE following may be interesting. I was informed in November 1896 that cholera existed at a hamlet called Seruthodam, about 8 miles from Jaffna, and that some 25 cases had already occurred. I visited the place and found that most of the cases were dysentery and the rest acute diarrhœa. I found that there was only one well, which was used by all the inhabitants of this hamlet; for, being low caste, they were not allowed to use any other well. This well was a mere hole in the ground without any masonry lining, parapet wall, or covering, and it was clear that all the filth from the compound (which, owing to the absence of any latrine, was polluted with the evacuations of the inhabitants including those of the sick) was continuously being washed into it by every shower of rain, which were then frequent.

I felt certain that the cases were entirely due to the use of this polluted water. On the 7th and 8th November I *personally* disinfected the well with permanganate crystals according to Hankin's directions, vide *Indian Medical Gazette* of July 1896.

On the 9th, 6 fresh cases occurred, and on the 10th, 1 fresh case, which cases may, I think, be attributed to the drinking of water from this well on the 6th or morning of 7th November *i.e.*, prior to its disinfection on 7th and 8th. However, after the one case of the 10th November, not a single fresh case occurred either of dysentery or diarrhœa.

I think this warrants me in concluding that the well was the chief, if not the only, cause of the 32 cases (with 8 deaths) of acute diarrhœa and dysentery which occurred at this village, and that this disinfection of wells would be beneficial, and should be tried in similar epidemics at other villages.

I do not know whether Hankin, or others, have advised this disinfection of wells with permanganate crystals in epidemics of dysentery, acute diarrhœa or typhoid fever, especially in villages, but I was so struck with the immediate beneficial effect in this instance that I issued a circular to all medical officers in this province, directing this disinfection to be carried out in similar cases, and the same instructions have since been issued by the Principal Civil Medical Officer to all medical officers in Ceylon.

JAFFNA, CEYLON; }
7th August 1897. }

PREVENTION OF CHOLERA.

DIRECTIONS FOR DISINFECTION OF WELLS WITH
PERMANGANATE OF POTASSIUM.

CARE should be taken to explain to the villagers that permanganate is a salt-like substance in whose preparation only mineral substances are employed, and therefore its use ought not to be objected to by the strictest Hindu.

2. The villagers should be warned against the danger of drinking any water except that from treated wells.

It should also be explained that the permanganate is not a medicine for patients, but merely a means of cleansing water.

3. Put two ounces of permanganate in the solid state into a bucket that has been filled with water from the well about to be treated. Stir it up and pour the red solution thus produced into the well, leaving the portion of permanganate that is not yet dissolved at the bottom of the bucket. Lower the bucket into the well, fill it with water, draw it up, pour back the water as before. Repeat the process, till all the permanganate has been dissolved. After half an hour draw up some of the water, and examine it. If a red colour is still present enough has been added. If the red colour has disappeared, then more permanganate should be added to the water in the well. In all cases enough permanganate should be added to produce a faint red colour lasting 24 hours.

4. From one to eight ounces of solid permanganate will be found to be sufficient for ordinary wells. If possible the permanganate should be added at night in order to leave the wells undisturbed as long as possible. The water will be fit to drink on the following morning. If at this time the water has a red colour, it will have a slightly unpleasant taste, but it is perfectly harmless.

5. Always care should be taken to treat with permanganate *all the wells in the place*, not only those used for drinking but also those used for washing purposes.

6. Usually water is kept stored in the houses in *gurras* (*i.e.*, buckets or chatties) for washing or other purposes. This should be poured away, and, if possible, the inhabitants should be persuaded to wash out their *pattais* (chatties) and other vessels with water containing permanganate. Unless this is done isolated cases of cholera are likely to occur even four or five days after the treatment of the wells.

(*Vide* Hankin's article in *Indian Medical Gazette*, July 1896.)

Note.—This disinfection of every well and every chatty or other water vessel should be carried out at every house in every village or station immediately a case of cholera occurs, and it should be repeated every second or third day while cholera continues.

HAYMAN THORNHILL,

Senior Medical Officer.

JAFFNA,

19th November 1896.

N.B.—The same disinfection of the wells should be adopted whenever many cases of acute diarrhœa or dysentery occur in any house or village.

Review.

WATER AND WATER SUPPLIES. By J. C. THRESH, M.D., & Co., LONDON. The Rebman Publishing Co. (2nd Edition, 1897.)

THIS is an altogether admirable book. It is intended to give the information necessary for forming an opinion as to whether any proposed or existing water-supply is wholesome and

abundant, and whether the cost can be considered as reasonable. It is of course primarily applicable to conditions in England, but there is little in it which cannot be applied to India.

What will first arrest the reader's attention is the detail and simplicity of the facts discussed. Just the right amount of technical detail is given to permit a non-professional reader to grasp the Engineering details.

The reader, however, will best be able to judge for himself of the value of the book if we briefly mention its chief contents. After a preliminary chapter on the physical properties of water and the action of water upon metals, we are given a useful chapter on rain and the storage, &c., of rain water. Following this comes an account of surface water, ponds, tanks, lakes, &c., such as Loch Katrine or Thirlmere, and their value as sources of water-supply. Sub-soil water and its movements, and the construction of wells of various kinds, deep, shallow, sub-soil and Artesian, are well described. River water and the vexed question of the self-purification of river water is treated in ample detail. The latter question is one which has given rise to much discussion. It is one which concerns us in India to a greater extent now that factories are becoming numerous on the banks of the Hooghly and other Indian rivers. One authority states that no river in England is long enough for self-purification, yet the river Seine, which receives the sewage of Paris, is said to be purer 30 miles below that city than it is before the sewage has entered into it. The question has arisen lately with reference to the deadlock in the London water-supply question, and the reader will find the whole question admirably discussed here, with numerous quotations and references to reports and papers, seldom accessible to the general medical reader.

Chapters 8 and 9 touch upon ground which is especially familiar to our readers, *viz.*, the relation of impure water to disease. From these chapters alone we withhold the praise which the rest of the book so clearly deserves. This is not the fault of our author, who here alone follows beaten tracks. In all the works of Hygiene which we have seen of recent years, we find the same old familiar instances brought forward without examination, or further detail, which were included in the first edition of Parkes. We refer to those familiar instances known to every student of the connection between water and diarrhoea, dysentery and malaria. We are not satisfied with these stories, however, nor do we think they prove as much as they are supposed to do. It is desirable, however, that some fresh evidence be produced before it is accepted as a truism that diarrhoea, dysentery and malaria are generally water-borne diseases. While we note this fault in our author, we do not forget that he has extremely clearly dealt with the

connection between impure water and cholera, and enteric fever.

Perhaps the best chapter in this little volume is that on the interpretation of water analysis. He shows that neither chemical analysis nor bacteriological examination, alone or both combined, are sufficient. Both can tell us impurity and risk, but cannot guarantee purity and safety. It is only when in addition to both these methods a full account of the geological source and the history of the water is given that any opinion as to whether a water is safe or dangerous can be of any value, and curiously this very knowledge of the source of the sample is often wilfully withheld from the examiner for fear it might influence or bias his judgment! The 29 examples given of waters to which disease has been, with much reason, attributed, which were certified as chemically pure, will open the eyes of many readers.

We have not shown half what is in this book, but enough to prove that it is a valuable one. We strongly recommend it to civil surgeons, jail superintendents, cantonment medical officers, and others, as a safe guide full of the needful detail. The volume naturally challenges comparison with Mr. Rideal's excellent little work on water purification; but we have no hesitation in considering Dr. Thresh's work by far the more useful of the two.

DRUGS AND APPLIANCES.

MESSRS. BURROUGHS, WELLCOME & Co. have constructed a Water Analysis case for readily ascertaining the potable value of a water, if necessary at the source of the water-supply. All the apparatus and re-agents, as well as printed forms, are contained in a mahogany case measuring 10" x 12," and 5" deep, and costing two guineas.

The case comprises the following re-agents:—Capsules of Nessler's re-agent, 'soloid' silver nitrate, each corresponding to two milligrammes of chlorine; 'soloid' potassium chromate; 'soloid' acid sulphate of sodium; 'soloid' potassium iodide and starch; 'soloid' zinc dust; 'soloid' soap, each corresponding to five milligrammes of calcium carbonate; 'soloid' potassium ferrocyanide; and 'soloid' potassium permanganate, each corresponding to 0.1 milligramme of oxygen. The apparatus consists of a boiling flask of 100 cubic centimetres capacity, with cork; a glass cylinder to contain 100 cubic centimetres, and graduated in cubic centimetres; a small nickel evaporating dish, three glass cylinders of a capacity of 100 cubic centimetres, and graduated at 70 cubic centimetres; stirring rods, tripod, a cleaning mop, spirit lamp, small glass funnel, filter paper, and a stoppered bottle to hold 120 cubic centimetres.

In India, where the question of water-supply is such a vital one, a case of this description might prove a great convenience to Sanitary officers, and to Medical officers of regiments or districts.

DRUGS.

MR. W. BURROUGHS, WELLCOME & Co. are indefatigable in adding to their list of Tablets. We have to acknowledge receipt of tablets containing Ergotinine Citrate, 1/100 gr., and Strychnine Sulphate, 1/20 gr., which should prove a useful combination hypodermically in uterine hemorrhage, and possibly also in certain vaso-motor neuroses. The full dose of Ergotinine Citrate is 1/30 gr., the general method being to inject one tablet, and repeat if necessary.

The Potassium Permanganate (2 grs.) Hypodermic Tablets have been prepared for use as an antidote in opium or morphine poisoning, on the strength of the evidence of Dr. Barber Smith, W. Moor, and several others. We have the evidence of Surgeon-Captain J. H. ... as the result of an extensive trial at Calcutta, that permanganate of potash can act only as a local antidote (if at all) to either opium or morphine, and that it can have no effect on what has been absorbed.

THE STANDARD.

A Scottish Life Office of 70 years' standing, and one of the wealthiest and most progressive of the Provident Institutions of the United Kingdom.

DOUGLAS STEWART,

Secretary,

Standard Buildings, Dalhousie Square,

CALCUTTA.

Indian Medical Gazette.

OCTOBER, 1897.

Nec manus nuda, nec intellectus sibi permissus, multum valet; instrumentis et auxiliis res perficitur, quibus opus est non minus ad intellectum quam ad manum.—BACON.

"INDIAN MEDICAL GAZETTE."

ITS PAST.

THE first number of the *Indian Medical Gazette* was published on January 1st, 1866, therefore it was started within a year of the time when the most senior members of the Indian Medical Service now on the active list, obtained their commissions.

Throughout the whole of its past history the *Indian Medical Gazette* has been intimately associated with the members of this Service. The credit of its inception was due to the late Deputy-Surgeon-General D. B. Smith, the first editor, who, like most of his successors, belonged to the Indian Medical Service. This remarkable man entered the Service in November 1855: served with distinction during the Indian Mutiny: acted successively as Civil Surgeon of Delhi, Mussoorie, Patna, Dacca, and Howrah: became the first Sanitary Commissioner with the Government of Bengal in 1863, when he had but eight years' service, and founded the *Indian Medical Gazette* within ten years of his landing in India. Afterwards he was appointed Principal of the Medical College, and First Physician in the Medical College Hospital, Calcutta. When he left India in 1885 he was elected Professor of Military Medicine and Tropical Diseases, at the Army Medical School, Netley, where he died four years later.

During the thirty odd years of its existence, the *Indian Medical Gazette* has not changed

its form, and its scope and aims are similar to-day to what they were in the beginning. On the title-page of the first number it is called "A Monthly Record of Medicine, Surgery, Obstetrics, Jurisprudence, and the Collateral Sciences; and of General Medical Intelligence, Indian and European." The present title is somewhat abbreviated; but the range of subjects is very much the same, except that more attention is devoted to Public Health, largely owing to the influence of Dr. W. J. Simpson, the last editor, and also because this science has made such immense strides during the intervening period.

The following is a list of the editors:—

David Boyes Smith	...	...	1866
John Purefoy Colles	...	...	1867
Charles R. Francis	...	...	1868
James Tyrell Carter Ross	...	...	1869-70
Charles Nottidge Macnamara	...	...	1871-73
Kenneth McLeod	...	...	1871-92
John Gay French	...	...	1875-76
Lawrence Austine Waddell	...	...	1884-85
William John Simpson	...	...	1889-97
Alexander Crombie	...	...	1892-93

Of these eminent names that of Brig.-Surgn.-Lient.-Col. Kenneth McLeod is most prominently and closely associated with the *Indian Medical Gazette*, inasmuch as he so ably conducted it during the space of twenty-two years, a period which amounts to over two-thirds of its life-history. Since his departure from India, five years ago, he has not severed his connection with the journal, for he continues to be one of its most regular contributors.

Dr McLeod was the first man of the first batch of Indian Medical Service cadets who studied at Netley. Curiously enough he came to India in the same month and the same year that the *Indian Medical Gazette* first made its appearance. His early stations were Jessore and Jalpaiguri, his work in which soon attracted the notice of the Government of Bengal, so that in 1869 he was appointed Secretary to a Commission on Indian Cattle Diseases. This led to his being appointed Secretary to the Surgeon-General for Bengal in 1871. From 1880 onwards he was successively Professor of Anatomy and of Surgery at the Medical College, and held the collateral charges of Second and First Surgeon at the Medical College Hospital, Calcutta. Since he retired in 1892 he has been associated with Sir Joseph Fayrer on the Medical Board at the India Office, and quite recently he has been appointed to the chair of Military Medicine and

Tropical Diseases at the Army Medical School, Netley.

Reference to the other editors must be deferred to a future occasion. At present we must pass on merely to glance at a list of the publishers of the *Indian Medical Gazette* :—

G. Wyman & Co. ...	1866-82
W. Newman & Co. ...	1883-84
Thacker, Spink & Co. ...	1885-97

ITS PRESENT.

Dr. Boyes Smith remarked in his introduction to the opening number of the *Indian Medical Gazette* that "Periodical literature in India, whether scientific or not, is with the utmost difficulty maintained so as to entitle it to a high meed of praise." This *dictum* still holds true of the present day periodical literature in India generally, and of the *Indian Medical Gazette* in particular.

The journal does not occupy the position it should do, nor does it come up to the standard it ought to, were it more worthy of 'a high meed of praise.' It is altogether too local, and might be more appropriately designated the *Bengal Medical Journal*, because it is not sufficiently representative of the sister Presidencies to entitle it to the larger term of 'Indian.'

Neither does it fully represent any of the groups of the medical profession in India, be they official or non-official, Civil or Military, European or Indian. At present many medical men of standing, who are authorities on special subjects, either transmit the valuable results of their experience earned in India to medical journals in Europe, or they keep their knowledge to themselves. In both cases, their action is quite consistent with their line of argument, which is, that there is no medical journal in India that comes up to the European standard.

ITS FUTURE.

With a view to rendering the *Indian Medical Gazette* more representative of the medical profession in India and the East, the Publishers are prepared to secure the services of Associate Editors in important centres such as Madras and Bombay. In addition to doubling their expenditure in this direction, they are also willing to make a substantial reduction in the annual subscription,—from eighteen to twelve rupees. Each contributor of an original article, lecture or clinical case, will receive twenty-five copies.

The future of the journal must depend largely on the support and assistance vouchsafed by the members of the Army, Indian, and Colonial Medical Services in India, Ceylon, the Straits Settlements and China.

In India the heads of departments in the different presidencies and provinces could afford invaluable aid by their influence, and by forwarding copies of their annual reports and other official memoranda for notice. The professors on the staffs of the Medical Colleges in the three Presidency cities, and at Lahore, are in a position to contribute lectures and clinical observations in their special subjects from the immense amount of material at their command. Civil Surgeons, with their enormously varied experience, could supply data from their dispensaries and jails, and from their medico-legal, sanitary, vaccination, and asylum work. The members of the Army Medical Staff, and of the Military Branch of the Indian Medical Service, have unrivalled opportunities for collective observations on large bodies of European and Native troops in camps and cantonments, and also for experience in military medicine, surgery and hygiene, while engaged in frontier expeditions. Last, but not least, every member of the services could help towards making the journal a bond of union by contributing matters of personal, service, or general medical interest to the columns set aside for 'Service Notes and Medical News.' At the same time it must be clearly understood that the *Indian Medical Gazette* will not lend itself to the discussion of politics, or to the ventilation of personal grievances and disputes, since its primary aim is a purely scientific one.

In addition to being a comprehensive and scientific record of the medical, surgical and sanitary work that is being carried on in the East, the *Indian Medical Gazette* might be made a valuable repository for collective investigation and research, and *ipso facto* it would soon become known in Europe as a reliable authority on the diseases of warm climates. There is a wide range of subjects to work at. For instance, in the present number of the journal, there are valuable contributions on the subjects of Elephantiasis, Yaws and Anthropology, in all of which important results could be obtained by collective investigation.

Although special emphasis has been laid on the necessity for obtaining the co-operation of

the Medical Services, yet there is no intention of forgetting the valuable contributions of civil medical practitioners in the past, or of setting aside their services in the future. Dr. Powell's important communication in this number of the journal contradicts any such erroneous assumption.

Though called the *Indian Medical Gazette* it was never intended that its utility should be restricted to India. With the help of the members of the medical profession scattered over the vast area included between Kashmir in the North and Ceylon in the South, and from Aden in the West to Hong-Kong or Shanghai in the East, an incalculable amount of valuable experience regarding climate and disease, much of which at present sinks into oblivion, might be collected and recorded. Private practitioners in the towns and in the planting districts of India and Ceylon, and medical missionaries who are located in India, Burma and China, could each and all help in establishing a mutual bond of professional sympathy. They could do much to facilitate communion and interchange of ideas between medical men, however distantly they may be removed from each other, by means of the *Indian Medical Gazette*.

DR. W. J. SIMPSON.

WITH regret we have to record the departure of Dr. Simpson from India in failing health last month. For the past eight years he has been associated with the *Indian Medical Gazette* as Editor or Joint-Editor. Never of a robust constitution, and frequently suffering from ill health, it is surprising how great was the amount and variety of his work during the past eleven years in India. His name was associated with every forward movement in medicine and hygiene in Calcutta during that period, in fact he was a man far in advance of his time as regards his Corporation appointment. Neither the Man in the Street nor many of the City Fathers could appreciate the value and importance of a scientific Health Officer. The Man in the Street is frequently practical and usually materialistic. Guided by his senses of sight and smell, especially the latter, he naturally cried out for scavenging; but he wrongly concluded that a highly trained, scientific Health Officer should function as Head Scavenger and Inspector of Nuisances. He also lost sight of the fact that no Health

Department has ever yet been able satisfactorily to deal with scavenging, unless it has been efficiently supported by stringency in the carrying out of Municipal Bye-Laws, and unless the citizens as a whole appreciate and act up to all that is involved in the term Citizenship, both as regards their city and their neighbours.

Calcutta is deplorably deficient both as regards stringency and citizenship, hence has arisen much of the opposition that its late Health Officer combated with such steadfast zeal, and hence also the unenviable notoriety that Calcutta continues to enjoy as a City of Smells.

In the *Englishman* of the 6th September there is an excellent summary of Dr. Simpson's life-work in Great Britain, in Egypt, and in India, from which the following extract is taken:—

"Dr. Simpson came out to India in 1886, at the instigation of the late Sir George Buchanan. His previous career specially fitted him for the post of Health Officer to Calcutta. He had held the office of Public Vaccinator and Poor Law Medical Officer for the Town of Dover for two years. He was then made Medical Officer of Health and Police Surgeon to the city of Aberdeen, and during his five years' tenure of that post was appointed Lecturer on Public Health in the University of Aberdeen, and held the important office of President of the Sanitary Association of Scotland.

"In 1883 Dr. Simpson visited Egypt during the epidemic of cholera there, his report being presented to Parliament in 1884, and in the same year he was sent as Special Inspector for the Local Government Board, on an inquiry into the prevalence of diphtheria in Somersetshire and Wiltshire. Since his election in 1886, as Health Officer of Calcutta, his special knowledge has more than once been in demand from home. In 1891, Dr. Simpson attended the International Congress of Hygiene in London. When unable to accept the invitation to give evidence on the Royal Commission on Vaccination, he was requested to write a special report to be included in the final Report of the Commission. In 1895 the Government of India adopted the scheme for a Sanitary Service in India as suggested by Dr. Simpson in a paper read before the first Indian Medical Congress, of which he was Secretary and Organiser. And more recently he has been engaged in working out the possibility of

producing an effective vaccine and curative anti-toxin for rinderpest. Among the more important sanitary measures introduced and successfully carried into effect by Dr. Simpson, not the least valuable to the community was his attack upon the wholesale adulteration of food. This resulted in the passing of the Adulteration Act, and in the establishment of a municipal laboratory, where everything connected with the food and water-supply of the town is subjected periodically to careful scrutiny, and timely investigation is made into the origin of outbreaks of contagious or infectious diseases. The cheap and easy, but highly injurious, practice of filling tanks with the garbage of the city, was denounced as productive of disease by pollution of the atmosphere, and causing contamination of the subsoil. Through Dr. Simpson's efforts in this direction, garbage incineration was introduced into the suburbs. We trust that this system will one day be extended to the town, abolishing the insanitary refuse platforms in Circular Road, which the retiring Health Officer has characterised as a disgrace to Calcutta.

"The inadequacy of the filtered-water service, especially in those areas most affected by cholera, has been another important contention with Dr. Simpson. But the severest battle he has had has been against the bad drainage of the town; a battle which, extending throughout his service, happily ended in victory last October, when the new drainage for the town and suburbs was inaugurated by the Lieutenant Governor. Hardly less prolonged has been Dr. Simpson's assault on the hitherto impregnable fortress of vested interests connected with the growth of the metropolis without adequate building regulations. For the past ten years, as shown by his reports, Dr. Simpson has been fighting this question. It is a source of satisfaction to the public, as it no doubt is to himself, that before he resigned, a strong Building Commission had been appointed to draw up a proper Building Act for Calcutta. But apart from administrative work for the advancement of the sanitation of town and suburbs, much has been accomplished by investigation into the causes and mode of the spread of cholera. The first research in this direction was the demonstration that cholera outbreaks could be produced by contaminated milk; next the demonstration of cholera germs in tank and river water at certain seasons of the year, and the consequent precau-

tions to be taken at these times. That Professor Haffkine's anti-choleraic inoculations (now acknowledged as possessed of undeniable efficacy in preventing epidemics of this virulent disease) were so thoroughly tested in the bustis of Calcutta, is due entirely to Dr. Simpson's ready appreciation of a great discovery."

QUININE EXANTHEMATA.

ALTHOUGH two hundred and fifty years have elapsed since the virtues of cinchona bark became known in Europe, and though seventy-seven years have passed since quinine was discovered, yet it has been only during the last thirty years or so that the skin eruptions caused by quinine, or cinchona preparations, seem to have attracted much attention amongst physicians.

In Europe they have been frequently noted of recent years. Binz,* for instance, states that: "Temporary affections of the skin are very common results after taking quinine. They usually appear in the form of eczema, roseola, erythema, urticaria, or purpura."

It does not appear, however, that physicians in India encounter numerous cases of cutaneous irritation, or eruptions, as the result of the administration of quinine. Is this merely because medical men find quinine eruptions so common that they do not consider them worth recording? Or are they really rare in this country? Or does it happen that they occur more frequently than the published instances on this subject would lead us to suppose, but that their nature has not been recognised? It would be interesting if medical men in various parts of India would give us the results of their experience of quinine exanthemata, and if they would state particularly whether such skin affections are confined to Europeans, or whether the various native races of the Indian peninsula are equally susceptible.

The consumption in India of quinine, cinchonidine, and other cinchona derivatives, must be enormous. Of recent years the practice of the prophylactic use of cinchonidine especially has become very general amongst troops stationed in malarious districts, and in many jails and asylums during unhealthy seasons. In addition, a large amount of quinine is distributed over the districts by means of the

* Lectures on Pharmacology, Vol. II.

admirable system of pice packets inaugurated by the Government of Bengal through the officials of the Cinchona Plantation, of the Alipur Reformatory, and of the Postal Department.

Trade returns show that the quinine out-turn of the world has amounted to upwards of two hundred and twenty tons in one year (Binz). Last year the Bengal Factory produced 10,672 lbs. of sulphate of quinine and 3,452 lbs. of cinchona febrifuge. Thus, it is evident that unrivalled opportunities exist for medical officers in India to observe and record the frequency and character of quinine exanthemata.

Let us now consider the nature of these skin affections. According to Dr. Prince A. Morrow, in his excellent monograph on Drug Eruptions,* they may be erythematous, urticarial, papular, vesicular, bullous, petechial or purpuric, and even gangrenous, or there may be two or three of these varieties combined. Branny desquamation, in large flakes or lamellæ, is a usual sequela when the eruption is fading. Various observers have noted that the erythematous form of quinine exanthem may simulate the rash of scarlatina, and also occasionally of measles. There may be a vivid red efflorescence, accompanied by pyrexia, by painful swelling of the fauces and pharynx, and desquamation follows on discontinuance of the drug.

That these cutaneous manifestations are the result of idiosyncrasy is obvious from their exceptional occurrence, and from the phenomenally small dose that will produce them in certain cases. Moreover, immunity is not acquired from repeated use of the drug, nor as the result of recurrence of the eruption. It is not necessary that the quinine should be swallowed for the cutaneous irritation to appear. It may result from a lotion, bath, hair-wash, tooth-powder, or pomade containing quinine. Workers in quinine factories, if they are susceptible to this cutaneous idiosyncrasy, are obliged to change their occupation.

Morrow records the case of a physician who suffered from severe urticaria as the result of a dose of two grains of quinine, and two years later a dose of one grain produced violent urticaria in less than an hour. Another extraordinary point in this case was the fact that the intolerance to the drug must have been acquired late in life, because at a previous

period this physician had lived in a malarious district, and had been accustomed to take quinine without any untoward effect. Heusinger has seen an eruption resembling erythema exudativum multiforme follow the administration of half a grain of quinine to a lady. On another occasion one grain and-a-half brought out an eruption of herpetiform vesicles on her cheeks.

Exception may perhaps be taken to the use of the term 'exanthem' as applied to an eruption caused by quinine, because its primary meaning is restricted to acute specific fevers accompanied by characteristic skin eruptions. However, its present significance has got the sanction of no less an authority than Dr. Prince A. Morrow, and in Keating's *Dictionary of Medicine* it is expressly stated that it may refer to any eruption of the skin. The combination 'quinine exanthem' is here employed to emphasise the fact that quinine eruptions are frequently associated with a general hyperæmia of the skin, a condition so marked as to have been described by different observers as "scarlatinal, scarlatinoid, bright red, measly, rubeolous, and erysipelatous."

CINCHONA CULTURE AND QUININE PRODUCTION.

In his *Annual Report on the Government Cinchona Plantation and Factory in Bengal for the year 1896-97*, Brig.-Surg.-Lt.-Col. G. KING, F.R.S., LL.D., reports that two successive years of drought have proved disastrous to the cinchona trees, which are so peculiarly susceptible to climatic conditions. The net diminution in the number of trees at the end of March was 800,250, and the total number of plants remaining was estimated at 2,683,451, all of the quinine-producing variety, except 185,000 trees of the red bark for the manufacture of cinchona febrifuge. This is consonant with the policy of cultivating quinine-producing barks in preference to other kinds. These results are very satisfactory when one reflects that it is only about forty years since there was a risk of quinine and cinchona-producing barks being exterminated, owing to the reckless and rapacious manner in which the South Americans destroyed the trees in gathering the bark.

To the Government of Holland is due the credit of conceiving the idea, and of successfully acclimatising cinchona trees in the mountainous

* Selected Monographs of Dermatology, New Sydenham Society.

districts of their Eastern possessions. This was in 1854, and the place was Java. Great Britain did not follow this example till 1859 or 1860; but there are now these flourishing plantations in the Sikkim-Himalayas, and others in the Nilgiri Hills, and in Ceylon.

Dr. King states that the out-turn of the factory was 10,672 lbs. of sulphate of quinine, and 3,452 lbs. of cinchona febrifuge. The amount of quinine issued during the past year was 8,482 lbs., of which 3,300 lbs. was used for distribution in pice packets.

The sale of cinchona febrifuge amounted to nearly 3,000 lbs. It is curious to learn that this form of drug is so popular with the public in Lower Bengal. "There is, for example, a single native practitioner in the Jessore district whose purchases of it last year exceeded the official consumption of the whole Province of Bengal (which has fallen this year to 30 lbs.)."

It is satisfactory to learn that the earthquake of the 12th June, which caused so much damage elsewhere in the Darjeeling district, fortunately spared the factory. But Dr. King takes the opportunity of pointing out that the occurrence of such an event, or of any other accident which might put a sudden stop to the work at the factory, shows how necessary it is to have a large reserve of quinine to fall back on.

SANITATION IN SRINAGAR.

DR. A. MITRA, Rai Bahadur, the Chief Medical Officer of Kashmir, and President, Srinagar Municipality, has recently reviewed the sanitary work done in Srinagar during the four years 1893 to 1896. His paper on the subject is deserving of special notice as shewing what undaunted courage and dogged perseverance can accomplish.

In 1892 the principal source of water-supply was the river Jhelum and the Nalla Mar canal, which were fouled to a terrible extent by the city drainage, sewage from roads and houses, carcasses of dead animals, a permanent boat population, burial grounds, trade impurities, butchers, washermen, and by the vast population who bathed therein.

The atmosphere was vitiated by the density of population (120,000 people on an area of 6 square miles), overcrowding of houses, accumulations of organic matter due to the want of public latrines, streets, lanes, and courtyards

being used as such—to the fact that the greater portion of the city was never scavenged, and by the numerous filthy cow-houses and pestering dunghills within the populated area.

All the city roads were covered with dust in dry weather and shut during the rains and could not be cleaned. There were no drains. Every house had a cesspool overflowing with decomposing sewage. The inhabitants were peculiarly conservative in their ideas and opposed to every sanitary reform.

At a time when, as Dr. Mitra remarks, the Municipal Committee (appointed in 1886), was dragging its feeble existence, an epidemic of cholera, more disastrous than any within human memory, visited Kashmir (1892). Attention was drawn to the greater danger of epidemic diseases of the kind, owing to the more intimate commercial relations between the Punjab and Kashmir, and to the necessity of sanitary improvement with a view to removing those conditions under which disease germs most rapidly develop. The interest of the authorities was aroused by the disastrous results of the epidemic, and, at their request, Dr. Mitra submitted proposals for pipe water, drainage, road improvements, open spaces, public latrines, a larger conservancy establishment and a more effective system of removing and disposing of filth, building regulations, improved cow-sheds, slaughter-houses, dredging and cleaning Nalla Mar canal, stopping burial grounds within the city, and simple sanitary rules.

His Highness the Maharajah and the Council called for a scheme and estimate which amounted to Rs. 3,74,000. This amount, however, could not be spared, and at a meeting of the Municipality, Dr. Mitra gave a most eloquent discourse on the terrible filthiness of the city, pointing out that cleanliness was enjoined to be observed both by the Shastras and the Koran; but despite his most earnest appeal it was unanimously resolved—"That the people were too poor and not in a position to bear the burden of any new taxation."

The Durbar, however, were determined to improve matters and sanctioned Rs. 2,00,000 for water-works, and Rs. 69,000 for roads, drainage and other municipal works. A programme of works, to be executed with the Rs. 69,000 was drawn, and although the unprecedented flood of 21st July 1893 swept almost everything before it, was carried out in its entirety, and the Member of the

Council in charge of the Municipalities at the end of the year remarked: "It appears that the people are not now so unconscious to the requirement of 'treasure of health', and have begun to appreciate such things as bodily cleanliness, latrines, drains and a good road, of which they had never heard from their forefathers even as a tradition."

In the matter of roads, drains, latrines, street lighting and class of houses, Srinagar has been completely revolutionised, and those who formerly abused the authorities now offer blessings with uplifted hands. It would take up too much time and space to mention all the improvements effected during the four years under review. Suffice it to state that all the sanitary rules that are in force in British Indian Municipalities have been brought into force in Srinagar, and, having the warm sympathy and support of His Highness the Maharajah and His Highness's Council, we feel sure that Dr. Mitra will not weary in well doing.

Medical News.

FAREWELL ADDRESS TO DR. W. J. SIMPSON.

ON Saturday, the 4th September, before a large and influential gathering of his friends and well-wishers, at the Dalhousie Institute, Dr. Simpson was presented with a public farewell address. Mr. W. R. Bright, the Chairman of the Calcutta Corporation, presided, and Dr. Bolye Chunder Sen, the President of the Calcutta Medical Society, read the address, which was as follows:—

To

W. J. SIMPSON, ESQ., M.D., M.R.C.P., D.P.H.,

Health Officer to the Corporation of Calcutta.

We, the undersigned, residents of Calcutta, members of the Medical Profession and officers of the Corporation, beg leave to approach you on the eve of your departure from this city, with this address as a token of our respect for your genial personal qualities and our appreciation of the valuable services you have rendered to the cause of sanitation and to the medical profession during the eleven years of your sojourn in India; and as an expression of our sincere regret at the loss of a valuable sanitary adviser to the town of Calcutta and of an energetic colleague to the medical public in India.

The period of your incumbency as Health Officer of this city has been signalised by many important sanitary measures, the credit of which

is largely due to your undaunted zeal and unwearied perseverance. Among the more important of these have been—the inauguration of measures to prevent pollution of the sub-soil and to place on a sounder basis the drainage system of the town; the introduction of the principle of incineration of the town refuse; the demonstration of the need of efficient building regulations for the town; the organization of an agency for the investigation of the causes and course of preventible diseases and the adoption of preventive measures; the establishment of a well-appointed Laboratory, the first of its kind in India, for food analysis and bacteriological research; the re-organization of the departments of food inspection and registration of births and deaths; the testing of the results of Professor Haffkine's system of anti-cholera inoculation; and the timely precautions taken to prevent the importation of plague into Calcutta.

The medical public is under deep obligation to you for re-affirming the relationship between small-pox and cow-pox; for creating an epoch in the history of medical progress in India by largely assisting in bringing to a successful issue the first Indian Medical Congress; for urging the necessity, for the whole of India, of an organized Sanitary Service which the Government of India has fully endorsed. Your successful researches into the bacteriology of rinderpest, your contributions to the ætiology of tropical diseases, and the able manner in which you acquitted yourself as President of the Calcutta Microscopical Society, Secretary to the Calcutta Medical Society, and as Editor of the *Indian Medical Gazette*, will be long and gratefully remembered by your colleagues in the medical profession in this country.

In bidding you farewell and God-speed we wish you and Mrs. Simpson a safe and pleasant voyage home and long life with health and happiness. We sincerely hope that you will have a prosperous and distinguished career in your own country. The greater opportunities that will be presented to you in Europe, together with your extensive experience acquired in one of the most important and difficult sanitary appointments in the East, will, we feel confident, enable you the more effectually to further the cause of sanitary reform than was possible at so great a distance from the centres of scientific thought and research.

REWARDS FOR PLAGUE DUTY.

THOUGH the difficulty is perceived of determining its precise character, some distinction it is very generally agreed should be bestowed by the Government of India upon the British soldiers who rendered, under most trying conditions, such effective aid in stamping out the plague. The duties, so cheerfully performed,

were by no means of a pleasant nature, and the danger incurred was of a character which would daunt many a man who would have no thought of fear if in face of a visible and tangible enemy, for the horrors of the plague are sufficient to shake the nerves of the bravest. It is thought, too, that it would be a distinct advantage, as it is also a duty, to demonstrate in this public manner the utter falsehood of the base slanders that have been cast upon these workers in the cause of humanity.—*United Service Gazette*.

WRANGLING OVER LEPROSY.

We have been favoured with a copy of some most unprofessional correspondence, couched in most unparliamentary language, between Dr. Albert S. Ashmead, of New York, and Dr. Ehlers, of Copenhagen. It is an undignified squabble in which charges and counter-charges are made concerning the copyright of the photograph of a leper, and regarding credit claimed for priority in originating the project of an International Congress on Leprosy. The disputants also agree to differ over the question of the isolation of lepers.

It would be much more seemly and practical if these two learned doctors would patch up their quarrel *privately*, and if they would consent to combine their knowledge and experience to solve the serious problem of how to suppress leprosy, or to prevent its spread amongst the various races of suffering humanity.

Of Congresses, medical or lay, there are probably too many now-a-days, and the only real advantage we can see in having an International Leprosy Congress would be that the delegates assembled should appoint a *permanent committee*, the members of which should continue to work actively at the subject of leprosy and its suppression, each in his own country.

In case there may be some misconception, we hasten to state that we disclaim all credit for this scheme, which belongs to one, or other, or both of these belligerent *savants*.

THE PASTEUR MEMORIAL.

THE subscriptions collected by the Medical Services in India amount to Rs. 7,038-11-0, while the expenses were only Rs. 181-7-0, leaving a balance of Rs. 6,857-4-0. The Civil Branch contributed Rs. 5,401-7-0; and Rs. 1,037-4-0 came from the Military Branch of the Services.

Service Notes.

ANNUAL MEDICAL REPORT OF ASSAM, 1896-97.

IN Assam vaccination is carried on by tea-garden agencies and by the staffs of dispensaries in addition to the regular vaccinating staff,

which is chiefly composed of paid vaccinators who preponderate in the proportion of more than six to one over the licensed vaccinators. The utilisation of all these various factors seems to work very successfully, because the largest number of vaccinations ever performed in Assam was attained last year, *viz*, 274, 696. The average number of vaccinations performed by each vaccinator was 1,103, at an average cost of 1 anna 5 pies for each successful operation, and the percentage of successful primary vaccinations was reported to be 96.6.

Inoculation was said to have been extensively practised in the Surma Valley, Sylhet, and Lakhimpur, also to some extent in the Garo Hills; but only one conviction seems to have been obtained, in which case the inoculator was fined Rs. 60.

The lymph issued by the Bovine Vaccine Depot at Shillong appears to have been excellent. Surgeon-Colonel A. Stephen expresses a preference for lymph preserved in glycerine to lanoline lymph. Arm-to-arm vaccination was practised with very satisfactory results in the Sylhet and Sibsagar districts; but the experimental trial of vaccination with fresh calf lymph at the Sadar stations of districts proved rather a failure, owing to the difficulty of obtaining calves and to the caste prejudices of the vaccinators.

THE REPORT ON THE RAJPUTANA STATES FOR 1896-97.

MR. CROSTHWAIT, C.S.I., the Agent to the Governor-General in Rajputana, reports that early in October, 1896, local and railway officials were warned to take precautions to prevent the spread of the Bombay bubonic plague. Careful inspection of passengers at railway stations, *eg.*, Ajmere, Abu Road, Chittore, Marwar Junction, Jeypore, Phulera, Bandiqui, Nana, Bikanir, Bhurtpore, and Ulwar, &c., resulted in 14 authenticated cases of plague being detected on the railway. Segregation camps were established at every important station, and arrangements were made for the treatment of infected passengers.

As a result of these precautionary measures, it is very satisfactory to learn that—"No cases of indigenous plague have been reported during the year, and Rajputana is believed to be free from the disease."

This report includes the Administrative Medical Officer's *Review on the Working of the Medical Institutions in Rajputana in 1896-97*. Surgn.-Lieut-Col. A. Adams, M.D., states that the registration of vital statistics has been attempted in 17 Native States, with imperfect results; that sanitation is making progress, especially in the large capitals of the states of Rajputana, *eg.*, Jodhpore. Kotah, Abu, Sirohi, Jaisalmir, and Oodeypore.

There has been a considerable reduction in the number of primary vaccinations; but this is easily accounted for by the migration from famine districts, and by the difficulties under which work was carried on in a year of great scarcity of water in desert districts, *e.g.*, in Bikanir the rainfall was only 8.24 inches, and in all the other states, save one, it varied between 13.8 and 27.4 inches. The percentage of the successful vaccinations was 98.5, and the cost of each operation 21 pie. In Ulwar, an excellent supply of lymph was obtained by vaccinating a young buffalo with humanized lymph. Small-pox was reported in 17 States, with 4,021 deaths resulting from this disease. Dr. Adams reports unfavourably on strychnine as an antidote for snake-poisoning. "Strychnia has not been found so successful in the treatment of snake-bite in Rajputana as Dr. Mueller's results would have led us to hope; the drug seems merely to act as a stimulant, as it does in other conditions of great depression, and it does not appear to have any special antidotal properties."

Malarial fevers and spleen affections head the list of diseases, forming 15 per cent. of the total treated; respiratory diseases amounted to 7 per cent., diarrhoea and dysentery to 4 per cent. There were 6,787 cases of cholera, more than half of which proved fatal. Only 3 deaths from plague were recorded. There were 791 cases of leprosy treated at hospitals and dispensaries.

There was a satisfactory increase in the number of surgical operations, which rose to 59,133 with a mortality of only .73 per mille.

REPORT ON THE CALCUTTA MEDICAL INSTITUTIONS FOR 1896.

As might have been expected after the severe epidemic of small-pox in Calcutta in 1895, the number of deaths from this disease markedly diminished during 1896, from 2,220 to 69 in the Calcutta Hospitals, partly owing to the protection afforded by the increased number vaccinated during the epidemic year, and partly owing to the ravages of the disease and the protection afforded therefrom. Both cholera and small-pox records in Calcutta show evidences of cyclical periodicity.

Cholera, on the other hand, increased during the past year, for the hospital admissions numbered 1,007 as compared with 600 in 1895, and the mortality was 56.2 per cent.

One Commissioned Medical Officer and two Civil Assistant Surgeons worked in conjunction with Professor Haffkine at anti-choleraic inoculations. As usual, the percentage mortality for dysentery and diarrhoea amongst Europeans and Eurasians, *viz.*, 5.96 and 10.0, respectively, was markedly less than that amongst the natives of India and all others, *viz.*, 29.68 and 43.82.

Venereal diseases showed an increase, whereas enteric fever remained nearly stationary in the Calcutta hospitals, there being only one more case than in 1895. Of the 23 enteric fever cases 16 were Europeans, 5 Eurasians, and 2 Natives. There were 45 cases of enteric fever in the Military Hospitals at Calcutta, Barrackpore and Dum Dum.

The year 1896 appears to have been a comparatively healthy one, because the total mortality in Calcutta and in Howrah was lower—35.7 and 37.34 per mille, respectively, as compared with 39.6 and 42.84 in the previous year. Owing to the year having been a healthier one, there was a corresponding diminution in the total number of in-door and out-door patients treated in the medical institutions of the city.

During the year the Bhowanipur dispensary was closed, and the South Suburban Hospital was opened in its stead; otherwise the list of medical institutions was the same as in previous years.

INDIAN MILITARY SERVICE FAMILY PENSIONS.

THE Military Accounts Department have recently issued a circular reminding subscribers to this fund of the advantageous terms under which they can secure passage money from India and outfit for their widows and orphans through the Insurance Branch. Every subscriber must furnish a health certificate on a particular form. By a special contribution, varying with age and subscription, he may assure a sum of Rs. 500 to Rs. 1,500 being paid to his estate, in the event of his death, for the primary object of passage money outfit for his wife and children. Any money not so expended will still be paid to his estate, irrespective of whether the casualty occurred before or after retirement, or whether he continued to subscribe to the pension branch up to the date of his death.

TRANSFERS FROM MILITARY TO CIVIL.

AN addition has been made to paragraph 29, I. A. R., Vol. VI, Medical, which runs: "Transfers from military to civil employment, and *vice versa* will be arranged for by the Director-General, I. M. S., in communication with the P. M. O., H. M. F., in India."

DIETARY IN HOSPITALS FOR BRITISH TROOPS.

PARAGRAPH 973 has been reconstructed. The Medical Officer's rejection of articles of diet at his morning inspection will no longer be final. He must inform the Commissariat Officer accordingly, and state (a) "whether the rejected article is not of sufficiently good quality for the use

of the sick, but is sufficiently so for men in health, or for sale on account of Government; (b) whether the article is absolutely unwholesome and quite unfit for issue to men in health, or for sale, adding his reasons for this opinion."

If the Commissariat Officer disagrees with the Medical Officer, and if the latter still declines to accept the article, the case is to be referred to the Officer Commanding the Station, whose decision will be final.

THE CARE OF MILITARY INSANES.

The following regulations have been made for the care of insane soldiers who are sent home in troop ships:—

(a) Two attendants (time-expired men) to be detailed for each violent, suicidal, destructive, or imbecile patient, and one such attendant for patients who are certified to be harmless or convalescent—invaliding boards being required to declare whether one or two attendants for each insane are necessary for the voyage. (b) The special duty of the attendants will be to look after their charges when on deck, and such proportion of them as may be deemed necessary by the senior Medical Officer on board, will be detailed for general attendance on insanes below, and they will receive extra duty pay at 4d. a day each. (c) When considered necessary, the Officer Commanding Troops on board will appoint a special non-commissioned officer to supervise the attendants on insanes, and take charge of their kit. (d) The special non-commissioned officer will receive 1s. a day as extra duty pay, which, as well as that of the attendants, will be passed to them on the completion of the voyage, on the authority of the "Ship's" order and certificate of discharge of duties.

HONORARY SURGEON TO THE QUEEN.

Surgeon-Major-General J. G. Faught, A.M.S., retired list, has been appointed Honorary Surgeon to the Queen. He served in the Ashanti Campaign, Afghan War, Egyptian and Bechuana-land Expeditions, and was Principal Medical Officer in the Operations in Zululand in 1888. He was last employed on the staff of the Duke of Connaught.

FROZEN MEAT FOR INDIA.

"That we are within measurable distance of frozen meat from the Colonies being supplied to India is shown by the fact that the Government of India have just called for estimates, and are considering the practicability of introducing the cold storage system for the supply of troops in Calcutta, Madras, Bombay, Rangoon, Kurrachee, and Aden with Colonial meat, as is already done at the Malta and Gibraltar stations."—*United Service Gazette*.

ARMY MEDICAL SCHOOL, NETLEY.

At the close of the seventy-fourth session of the Army Medical School, the following Surgeons on probation obtained their commissions:—

A. M. S.			
	Combined Marks.		Combined Marks.
*S. L. Cummins	... 4,871	J. Poo	... 3,942
J. McArdlo	... 4,455	H. L. W. Norrington	... 3,928
†G. H. Hopkins	... 4,247	H. G. F. Stallard	... 3,806
L. J. C. Hoarn	... 4,227	R. D. Jephson	... 3,654
P. Mackessaek	... 4,172	J. Crean	... 3,577
J. McD. McCart hy	... 4,147	A. W. N. Bowen	... 3,413
E. Brodribb	... 4,085		

I. M. S.			
	Combined Marks.		Combined Marks.
‡J. G. P. Murray	... 5,644	A. Fenton	... 5,093
§S. Anderson	... 5,428	J. A. Dredge	... 5,006
¶F. H. G. Hutchinson	5,390	R. W. Knox	... 4,885
‡J. L. Majoribanks	... 5,208		

THE INDIAN MEDICAL SERVICE.

THE Surgeon-Lieutenants who have recently entered the service have been thus distributed. It is reported that they have been ordered to proceed to India at once, in view of the present crisis resulting from famine, plague and field service requirements.

Bengal Command.—J. G. P. Murray.

Punjab Command.—S. Anderson.

Multras Command.—A. Fenton, J. A. Dredge, R. W. Knox.

Bombay Command.—F. H. G. Hutchinson
J. L. Majoribanks.

A. M. S. AND I. M. S. EXAMINATIONS.

The following is a list of successful candidates for commissions:—

A. M. S.			
Out of 22 candidates 19 were admitted, the number of vacancies being thirty-six.			
Names.	Marks.	Names.	Marks.
H. O. B. Browne-Mason	2,933	J. D. G. Macpherson	2,139
B. Watts	... 2,713	W. P. Gwynn	... 2,129
H. G. Martin	... 2,700	C. J. O'Gorman	... 2,129
F. S. Penny	... 2,671	M. M. Lowsley	... 2,109
S. de C. O'Grady	... 2,441	N. H. Ross	... 1,986
T. H. Goster	... 2,377	E. A. Bourke	... 1,965
J. G. Berne	... 2,127	A. C. Lupton	... 1,868
A. H. O. Young	... 2,298	P. H. Collingwood	1,848
J. E. S. Old	... 2,206	G. B. Carter	... 1,809
F. F. Carroll	... 2,176		

I. M. S.

There were 18 appointments, for which 33 candidates competed, of whom 32 obtained qualifying marks.

Names.	Marks.	Names	Marks.
T. H. Delany	... 3,124	G. Tait	... 2,777
J. W. F. Rait	... 3,020	P. K. Chitale	... 2,776
S. R. Douglas	... 3,012	G. M'Pherson	... 2,701

*Gained the De Chaumont Prize in Hygiene.

†Gained the second Montefiore Prize.

‡Gained the Herbert Prize of £20, the Martin Memorial Medal and the Pathology Prize presented by Sir Joseph Fayrer, Bart., & C.S.I.

§Gained the Maclean Prize for Clinical and Ward work.

¶Gained the Parkes' Memorial Medal.

‡Gained the first Montefiore Prize of 20 guineas and Bronze Medal.

Names.	Marks.	Names.	Marks.
S. Hunt ...	2,966	F. D. S. Fayer ...	2,697
E. J. O'Meara ...	2,937	W. H. Cox ...	2,678
R. F. Baird ...	2,889	De Ve Coudon ...	2,697
A. T. Gage ...	2,877	H. A. J. Gidney ...	2,648
G. C. Laing ...	2,854	A. G. Sargent ...	2,606
H. Kirkpatrick ...	2,807	W. Lethbridge ...	2,500

UNATTRACTIVENESS OF THE MEDICAL SERVICES.

THE sudden demand for medical officers that has arisen in India for famine, plague, and war duty, may serve to bring to a head the long standing contention over the Army and Indian Medical Services. The call from Northern and Western India has denuded Bengal of quite half its medical officers, and large and important stations have been left in charge of, in many cases, inadequately qualified men. The question as to why the Army and Indian Medical Services cannot attract enough recruits arises, but it is not necessary to wait long for an answer. "When medical men," says the *British Medical Journal*, "find they can serve the State with comfort and dignity, there will be no lack of Army Medical candidates." It was hoped that the bestowal of combatant titles would in some measure remove the disabilities under which army surgeons labour, but owing to certain foolish and antiquated prejudices which ought not to exist, the natural and proper recognition of medical officers is still delayed. The unpopularity of the Army Medical Service is shown by the fact that for the thirty-six vacancies advertised this year, only twenty-two men competed. Of these nineteen were declared eligible. It is, moreover, a well-known fact that the real number of vacancies is quite double that advertised. It is surely extraordinary that for a Service which ought to attract large numbers of men of the best type, the Army Staff can only secure one candidate for every four vacancies. The present state of affairs, apart from its being a reproach to the country, carries with it the danger of much suffering and loss of life to the Army, the heads of which ought from the lowest point of view, their own interest, to take steps to see it remedied.—*The Englishman*.

THE PRESENT OVERCROWDING OF THE MEDICAL PROFESSION.

WHEN the number of candidates for the Army and Indian Medical Services has fallen so low, and when the need of medical officers in India is so great, it is strange to read in the columns of *The Lancet* and *British Medical Journal* of a long correspondence in the *Standard* relative to the great overcrowding of the medical profession, and of the difficulty there exists for those in its ranks to earn a competence.

"The overcrowding of the medical profession is a matter which should be taken into serious consideration by those intending to enter it.

In the last ten years the number of medical practitioners increased by over 20 per cent., while the population of the United Kingdom increased only by 7 per cent. in the ten years 1881 to 1891. The average earnings of each one must therefore tend to be smaller than they were. This reduction of the average earnings is aggravated, it is said, by several abuses which should be remedied. Dr. Garrett Horder enumerates in the *Standard*—(1) The enormous growth of the out-patient departments; (2) the increase of patent medicines; (3) the liberty allowed to quacks; and (4) the extensive prescribing by chemists."—*B. M. J.*

Transactions of Medical Societies.

THE BOMBAY MEDICAL AND PHYSICAL SOCIETY.

THE usual monthly meeting of the Bombay Medical and Physical Society was held in the Durbar Room, Town Hall, on Friday, 6th August 1897, at 4-30 P.M. Brigade-Surgeon-Lieutenant-Colonel F. C. Baker, in the chair.

SURGICAL CONSIDERATION IN CONNECTION WITH FILARIA SANGUINIS

By Surgn.-Lieut.-Col. W. K. Hatch.

There are several conditions occurring in those suffering from filaria sanguinis, for which surgical opinion may be sought, and first I would refer to enlargement of the lymphatic glands.

This condition to anyone who sees by himself such a case is often extremely puzzling, as it is particularly difficult to find out the cause for the apparently simple enlargement. I remember being at sea in more than one case of the sort, and I do not think that sufficient stress has been laid by writers on the difficulties of diagnosis and the frequency of the occurrence; with the exception of Dr. P. Manson and Dr. V. Carter, few have described at all fully, as far as I am aware, this peculiar enlargement. The glands most usually affected are those in the groin, and the next set most often enlarged is the axillary, then the iliac glands, and very rarely those of the neck. With regard to those in the groin, the chain parallel to Poupart's ligament are usually affected, but a less enlargement below the ligament by the side of the femoral artery is not uncommon.

Nature of the Enlargement is peculiar. the glands have usually a soft doughy feel, and can be made, when small, to almost disappear; when pressure is removed, they gradually re-appear, but at other times they are much more tense and resistant to pressure, and cannot be diminished appreciably, and fluctuation can be detected in them.

Periodical Enlargement.—As Dr. P. Manson has pointed out, these glands are subject to periodical enlargement, during which time they become tense, hot, elastic, and often extremely painful, the patient at the same time suffering severely from fever, lasting for several days, during which he is quite incapacitated for work. The severity of these symptoms lasts for a varying period,—in some only for a couple of days, in others for a week at a time—and the tension and pain felt in the swellings varies in the same manner, but not necessarily in proportion to the fever; but usually when the fever is high, the glands are most painful. The filaria sanguinis can usually be detected in the blood at night during the attacks, hence the difficulty of diagnosis is generally found in the interval between the attacks, and the history must then be carefully inquired into, especially as it often happens that after a time a long period of quiescence takes place, so that the patient does not mention to the Surgeon anything about his former illness.

Structure of the Glands.—On removal of the glands I have found that on section a considerable quantity of reddish fluid usually flows out, and if they are opened while still in the body a large quantity of this fluid will continue to flow. The glands have an open spongy structure, and numerous large lymphatics can be seen to be in connection with them on all sides.

In some cases the difficulty in diagnosis may be considerable, when only one gland is visibly enlarged; this is particularly the case in those below Poupart's ligament. I have had several

instances in which the nature of the swelling could not be made out, and in one, the patient, a boy, had worn a truss for some time. The symptoms are fullness in the vicinity of the femoral vessels when the patient is erect, which is lessened by the recumbent posture; a somewhat flat, slightly elastic, swelling with a slight impulse on coughing is found; steady pressure causes this swelling to diminish, but it cannot be felt to move away altogether; it is most likely to be mistaken for a femoral hernia. Two boys and a young Hindoo, about 17 years of age, were seen by me with these swellings, and the nature of the disease was in the cases of two of them fully diagnosed by keeping them under observation; both had fever and filaria in the blood; the third patient had fever, but no parasites could be detected. I have also seen one or two boys with similar swellings but no fever. Difficulty may also arise in the case of the axillary glands; these glands may be opened by mistake for suppurating glands of the ordinary kind, as the real nature may not be properly made out. In the case of glands situated by the side of the external iliac artery I have known opinions differ as to whether the patient had pelvic inflammation, abdominal tumour or some accumulation in the bowel, as the swellings are generally bilateral, and as far as I have seen, vary in size or disappear altogether; these points with a history of fever will aid diagnosis.

Treatment.—I have usually advised that these glands be left alone, but in a few instances, where they have given rise to pain in the groin during movements, I have removed them; the wound takes usually some time to heal; if fever is periodical an interval should be chosen to perform an operation. In one severe case I was persuaded to operate, certainly against my wish. The patient was a strong young fellow who had suffered for several years from periodical attacks of fever with swellings in the groins and abdomen; those in the groin were so extremely painful during the attacks that he himself and his parents very much wished to have them removed. This I did during an interval; the operation was difficult, as after the removal of the glands the divided lymphatic discharged such a large quantity of fluid that the tissues were kept saturated; at length firm pressure stopped the discharge. For the first few days all went well, but suddenly the temperature went up as if an ordinary periodical attack had come on; the face, however, assumed a dusky hue, and in 24 hours the extremities became livid, the circulation in the radials, then in the brachials, ceased gradually, and the patient sank much to my concern. I have since refused to remove such glands; some surgeons have operated on cases in which the glands were considerably diseased with success, I understand, but I cannot see how much relief is to be afforded.

Another condition not easily made out is a *varicose state of the lymphatic of the spermatic cord*. I had met with several enlargements here, the nature of which I was not at all certain, and at length a patient was operated on in the J. J. Hospital by Mr. Masina for a swelling of the right inguinal region which had partly the feel of a hernia and partly that of a varicocele; it was rather soft with slight impulse, smaller when lying down, but did not entirely disappear, and some indefinite stricture was left which might have been the edge of a hernia sac or emptied blood vessels. On cutting down on this and dissecting it out the dilated lymphatics were clearly made out; they were ligatured and removed; unfortunately, the specimen has been lost from the Grant Medical College Museum. In this case there was no testicular enlargement, but in others, where there has been a similar state of things, both cords and both testes have been large, smooth and elastic, and moderate hydrocele present. I have found in these latter, history of periodical attacks of fever. Lastly, in the very early stages of Elephantiasis with filaria in the blood, it is often very difficult to diagnose the disease by merely attending to the scrotum alone; the wrinkled appearance of the scrotum, the surface of which is often covered with yellowish scabs, is very like that met with in eczema, the result of some irritation as ringworm, etc., and if the attack is the very first from which the patient has suffered, there is of course no history to guide; the fever too need not be high, and it is usually only after several attacks that a definite diagnosis of Elephantiasis is arrived at. I have known early operation advised in such cases, but I do not think that this is a right procedure, because the disease is extremely likely to return, and in fact I may say almost certain to do so, as in a case reported in the *Lancet* this year. The patient should be allowed to wait, because it seems that the disease becomes quiescent, at least as far as the febrile attacks are concerned, and the enlargement may even cease permanently, but generally it continues without febrile symptoms as already mentioned; and I have seldom found any return after operation in such cases, though I have known slight recurrence take place, especially if any of the serotal tissues have been left to form flaps for the testicles. Nor is filarin sanguis always to be discovered. It seems to me, too, that these conditions and a moderate amount of Elephantiasis of the leg are more common among the Parsees than among the other races in Bombay. I am sure that some of our experienced practitioners in Bombay will bear me out when I say that it frequently happens that the father, mother or grandfather and grandmother have suffered from the same disease, which has become quiescent. Is this due to hereditary causes or merely to the fact that the environment is the same for all? It is difficult to decide this point,

perhaps impossible, and information from some of those present to-day would be most acceptable. The drinking water of Bombay is certainly good when obtained from the Velar and Tansa pipes, but there are certain wells in Bombay which orthodox Parsees always use, observing ancient customs; has the water from these wells any connection with filaria, or is the disease contracted outside Bombay at some of those places from and to which Parsees frequently travel, as Surat, &c.? Hindoos, too, use certain wells, and if they, as it seems to me, do not suffer from filaria, &c., to the same extent, then I think the cause is mostly to be found outside Bombay, at low-lying places upcountry where mosquitoes congregate, but the scope of this paper will not allow me to go further than refer to this point.

SYNOPSIS OF 800 (EIGHT HUNDRED) CASES OF LABOUR IN THE PARSI LYING-IN-HOSPITAL, WITH SOME OBSERVATIONS

By Dr. Temuljee Bhicjee Nariman.

Age of Patients.—The youngest woman confined was 14 years old and the oldest 45.

Number of Pregnancy.—Twenty-four per cent. of all admissions were primiparae, (188). The largest number was 18 para; average number of pregnancy, 4.

Previous History.—One hundred and ninety-three patients or nearly 25 per cent. gave a history of one or more previous abortions.

Conditions during Pregnancy.—Five hundred patients enjoyed good health; two hundred and ninety-four suffered from some ailment or other during pregnancy.

4. *Labour—its nature:*—

765 were vertex presentations.
25 breech.
7 face.
2 foot.
2 shoulder.
1 head and arm.
1 head and funis.
1 foot and funis.
1 elbow.
1 placenta and breech.
1 placenta previa.

Deliveries.—Natural, 762; Instrumental, 33.

Instrumental Deliveries.—Forceps, 31; turning, 4; craniotomies, 2; symphysiotomy, 1.

Of the forceps cases, more than half were primiparae. In all my forceps cases my principal guides were pulse and temperature. If they both kept normal, I did not hasten delivery unless the patient herself wished for it. As a rule, our women always preferred delivery without any instrumental aid. They sometimes preferred waiting for hours, and so long as the pulse was good and temperature normal, I never cared to interfere. But in all cases where the head remained on the perineum for three hours without making any progress, I applied the forceps. The only diameter that was found narrow was the antero-posterior, very often due to the promontory of the sacrum projecting forward and reducing the diameter by about an inch. This was the only deformity of the pelvis observed in this hospital, and that, too, a very trifling percentage, judging from the number of normal deliveries. From the external measurements of the pelvis given below, you will find that they are smaller than the European pelvis, but, as the foetal diameters are also smaller, there is not much need for any instrumental aid. The only case where symphysiotomy was performed, the antero-posterior diameter was two inches, but the transverse was roomy enough. Here, as the fœtus was alive, I thought of symphysiotomy or Cæsarian section. I consulted my friend, Dr. Dimmock, as I had seen some of his symphysiotomies. Dr. Dimmock was also for Cæsarian section, but the patient's friends were against it. She was put under chloroform, and Dr. Dimmock performed subcutaneous symphysiotomy. The infant was delivered by forceps; he was revived by artificial respiration, but died after a fortnight. There was a small vesico-vaginal fistula left in the mother, who, though the joint seemed united, was not able to walk for some months. It is nearly sixteen months now since the operation, and she moves about freely now.

Craniotomy.—Of the two cases, one was a case of slight shortening of antero-posterior diameter, where one of my junior colleagues applied the forceps, but, failing, the head was performed, and with difficulty the child was removed. It was a large child weighing nearly nine pounds. The second case was that of a primipara with breech presentation; the head was hydrocephalic. I perforated behind the ear, and nearly a pint and a half of watery fluid escaped. It came off very easily afterwards.

Turning.—Of the four cases of turning, two were shoulder presentations, one elbow, and the fourth was a case of placenta previa. I give a few notes of the case of placenta previa, as the treatment adopted is the one I would advise others to follow in similar cases. Here I used for the first time Champetier de Ribes' bag with marked success.

S. D., aged 28 years, 5 para; duration of pregnancy, nine months.

—Her second delivery was by forceps. She had bleeding first a

the fifth month, which made her uneasy. The bleeding recurred at irregular intervals, and she came to Bombay, after completing eight months. On the 2nd August 1895, she had a little bleeding in the early morning. I was sent for to see her at her home. There was no bleeding when I saw her and no pains. I could on vaginal examination easily introduce my finger into cervix, and detected lateral placenta previa. I advised her removal to our hospital.

The patient was admitted into the hospital at 10-30 A.M. on the 2nd August. She had very feeble pains; os dilated to the size of a rupee, soft. There was bleeding. An antiseptic vaginal douch was given. Chapetier de Ribes bag, smeared with carbolic oil, was introduced into the uterine cavity. Water was pumped in with an Ingram's syringe; the tap turned and the bag was left in the uterus; labour pains became stronger, and at 1 P.M. the bag was expelled from the uterus and vagina. There was not a drop of blood lost in the interval. I ruptured the membranes, seized one foot and delivered by turning. The child was 7 lbs. 12 oz. in weight and alive. She had a normal puerperium, and both mother and child discharged in healthy condition.

External measurements of the pelvis—

	Parsi. Inches.	European. Inches.
Iliac crest	9.5	10½
Iliac spine	8.37	10
External conjugate ...	6.78	7

Average fetal diameters—

Occipito-frontal	4.31	4.50 to 5
Occipito-mental	5.40	5.25 to 5.50
Biparietal	3.315	3.75 to 4

9. *Weight of child.*—The average weight of a newly born Parsi child was 6½ lbs.

Still-births.—There were 32 still-births in 800, that is, 4 per cent., while the average proportion in the Parsi community is 7 per cent.

Infantile mortality in the Hospital.—It averages 3 per cent., while the mortality in infants from one day to one month old in the community is six per cent.

Maternal mortality.—In the first year, among 305 patients, we had one death. This was a patient suffering from cardiac and renal disease, and had adherent placenta which had to be removed by introducing the hand into the uterus. She had no fever and no particular symptoms till the eighth day, when she complained of severe headache. It became much worse, notwithstanding the treatment, and on the eleventh day she got convulsions, became comatose, and died at her place few hours after removal. In 1896, out of 344 patients, we had six deaths. Three of these deaths occurred under most unfortunate circumstances. We had an English nurse very competent and conscientious. She delivered a primipara, and there was slight laceration of the perineum; the patient developed septic symptoms and died. I sent the nurse home for a short holiday, as I did not like her to attend other cases. She came back after a month. For some time nothing happened. Then again two other cases delivered by the same nurse suffered from septic fever and died. We had three nurses, two paid and one probationer; they delivered cases by turn. All the cases delivered by the other two escaped, while the two cases delivered by this particular nurse suffered from septic fever and died. I tried my utmost to find out the cause, but could not trace it. The nurse herself was much distressed at these unfortunate occurrences, and made up her mind to give up midwifery work. I had, of course, to ask her to leave the hospital, and there were no more cases after she left, though it is more than a year.

The fourth was a case of malignant small-pox. Patient was admitted with high fever, said to be of two days' duration; had natural labour but the child was still-born. On the second day, she had small-pox eruptions. In a few hours they became hemorrhagic, and she died. Small-pox was raging at this time. In that same month we had to send another patient home for developing small-pox.

The fifth case was a multipara, a strong bulky woman. She had a tumour of the size of a small cocoon in the right hypochondriac and lumbar regions; seemed as if it was connected with the kidney. She had fever on the third day of delivery: pulse quick and very weak; urine containing large quantity of albumen, more than half. Fever subsided on the fifth day. At noon on the tenth day, patient complained of a severe pain in the right hypochondrium; in fact, in the region of the tumour. Extremities became cold, pulse imperceptible, respirations laboured; she never rallied; the tumour had probably burst.

The sixth case was a multipara, admitted in an advanced stage of phthisis, with severe cough, diarrhoea, and hæmoptysis; died on the sixteenth day.

In the remaining 150 cases we had one death. She was a patient admitted with high fever of some days' duration. She was in a critical state, the temperature rose higher after delivery, and she died on the second day. There were two cases of continued fever in the same house where she came from.

All these cases of deaths, as you will see, were not due to any difficulty in labour or the result of operation. All our operation

cases were successful. I should have compared the mortality in mothers in the hospital with the general maternal mortality, as I did in the case of infants, but, unfortunately, these deaths are not registered under distinct or separate heading. I have made arrangements from this year to have a regular register, and hope to make a favourable comparison at some future date. The mortality among mothers is not only of those who died in the hospital, but also of those who died at home after removal. Our percentage of maternal mortality, as you see, is one per cent. I wish I could get statistics of other maternity hospitals in our city.

Duration of Pregnancy.—Seven hundred and sixty-eight were full term; 32 premature. Placenta was found adherent in 20 cases, and had to be removed manually.

Perineum.—It was lacerated in 50 cases, that is, 6½ per cent. if you take the total 800, and 26.5 per cent. if you only take the primipara.

Post-partum Hemorrhage.—There were 4 cases of severe post-partum hemorrhage; two of these after forceps operation. For treatment I rely principally on bimanual pressure. It never fails. Ergot and hot-water irrigation are also resorted to in mild cases.

Children.—There were 405 boys and 402 girls, the extra seven being due to seven cases of twins. Of these 14 twin children, 4 died in the hospital, and 10 left in good condition. Of these 4 deaths, 3 were of premature children.

Artificial Respiration.—Twenty-four children were revived by artificial respiration.

Principal Ailments in Children.—Infantile diarrhoea is very common in some months of the year. Climatic influence, maternal feeding, and clothing of infants are to be carefully watched. We had very few cases of infantile diarrhoea during the last twelve months, and almost all of them easily relieved by West mixture to infants and 15 grains of chlorate of potash, three times daily, to mothers. Very often chlorate of potash treatment of mothers relieved infantile diarrhoea.

Jaundice.—Yellow tinge of the skin and conjunctiva alarms the mothers no doubt, but it disappears in a few days. I generally prescribe a sixth of a grain of hydrargyrum c. creta, and a sixth of a grain of pulv. ipecac with sugar of milk. Infantile convulsions and trismus are very rare; we had only one case of trismus and three of convulsions.

Ophthalmia Neonatorum.—We had a few mild cases in the commencement, but it is almost absent these last twelve months, since we commenced washing the eyes of the new-born with boracic lotion as soon as the infant was born.

REPORT OF TWO DIFFICULT LABOURS.

By Surgn.-Capt. A. J. Heath, I. M. S.

The following two cases occurred recently in the Obstetric Department of the Sassoon Hospital, Poona. They were both interesting cases, and I venture to draw attention to them not because of any peculiarity in either of the cases or its treatment, but because they illustrate how well native women recover after most difficult labours. This was especially marked in the case of the first woman, who had been pulled about and ill-treated by a native midwife for three days before admission to hospital, and whose condition on admission was very critical.

CASE I.—A Hindoo Maratha woman, aged 35.

She had been pregnant five times previously, and had had 1 miscarriage, 2 still-born children, and 3 living children. The last child was born about 3 years ago.

She menstruated last in September 1896, and had good health during her pregnancy.

Labour came on on 14th June 1897, and she was attended by a native midwife, who for three days made ineffectual efforts to deliver her.

She was brought to the Sassoon Hospital at 1-30 P.M. on 17th June 1897 in a state of collapse. The House Surgeon, Mr. Dias, was sent for, and found her with a very weak pulse, which could only just be made out at the wrist. On examination he found that an arm of the child was protruding into the vaginal opening from which the energetic but misguided midwife had pulled off the hand near the wrist, so that the sharp ends of the radius and ulna were sticking out. The umbilical cord was also somewhat prolapsed, and in the upper part of the vagina was a fleshy mass which was the anterior lip of the cervix uteri, very much swollen and stretched.

Before attempting delivery, he gave her, at intervals, two hypodermic injections of ether and digitalis (̄m m X). Then, when she had rallied, he first of all, with bone forceps, removed the projecting ends of bone, so as to prevent accidental laceration of the part, and then tried to turn, but failed to alter the position of the child.

I saw the case at about 4-30 P.M., and found, on examination, that it was a case of tightly-impacted right shoulder with prolapse of the right arm, part of which had been torn off as above described. The child (which was dead) was lying transversely—chest forwards and with the head to the right side of the pelvis. There was no apparent contraction of the pelvis.

The patient was put under chloroform, and a little urine drawn off by catheter. An attempt was then made to push up the

shoulder and let down a leg, but the shoulder was too firmly impacted. I therefore introduced a Ramshotham's hook and divided the neck, after which the separated body came away fairly easily. There was a little difficulty in removing the loose head, though forceps were applied. I therefore got an assistant to steady the head with the forceps and by external abdominal pressure, and, introducing the perforator, let out some of the brain matter, after which the head came away readily by traction with the forceps. There was no difficulty with the placenta, which came away easily when expressed by Crile's method.

The swollen and prolapsed cervix was then examined, and its inner surface found to be a good deal bruised and lacerated.

The temperature after delivery was 101° . One drachm of the liquid extract of Ergot was given, and the put was douched, binder applied, &c.

The next day (18th June) the morning temp. was $99^{\circ}4$, evening temp. 101° ,—she had not slept well. The discharge was almost purulent and very foul smelling. Intra-uterine douches of carbolic lotion (1 in 50) ordered to be given morning and evening, and iodoform blown on to the cervix.

On 20th June the temperature, which had been ranging between 101° and 102° , fell to $98^{\circ}4$, and she became very pale and collapsed, but was brought round by hot bottles, brandy, &c. This was followed by diarrhoea, which was checked by ordinary astringents.

The rest of the after history showed gradual improvement—the inner surface of the cervix sloughed in part, and for some days the discharge was most offensive. The temperature ran up in the evenings—never above 102° . The discharge got gradually less offensive and less in quantity, and the temperature showed a corresponding fall.

On 5th July the temperature fell to normal and remained there. There was a little diarrhoea on the 6th, and then all went well till 10th July, on which day she left hospital quite well, except for a certain amount of weakness.

CASE II.—A *London woman, et., 25, was admitted to the Lying-in Hospital at 1 A.M. on 4th July 1897.*

She had a history of two previous pregnancies, in both of which she had been admitted to hospital for difficult labour. The first was a foot presentation, and in the second forceps were applied—both children being still born. The date of the last labour was December 1895.

Labour pains had begun at 6 P.M. the evening before (3rd July). The membranes ruptured at 1 P.M., when the right arm and left foot of the child presented.

I saw her at 8 A.M., by which time the body of the child had been brought down, but there was a difficulty in delivering the head, an attempt to introduce forceps having failed (The child was dead.)

The patient was a small woman, but there was no marked deformity pointing to contraction of the pelvis, though the history made one suspicious.

On examination I found the pelvis very much flattened, the promontory of the sacrum being within easy reach of the finger. (In roughly measuring the diagonal conjugate diameter, I found it little more than 3 inches.)

I therefore decided to perforate the head, which was done in the usual way, in this case the perforator being introduced just above the left ear. The neck of the child was so thin that I was afraid to pull on it strongly. I therefore helped the head out with a crochot, hooking it into the wound made by the perforator.

The placenta came away easily. She was given Ergot and douches with solution of pot. permang.

The after history was uneventful. The temperature for the first three days just reached 100 in the evening, after which it remained normal. The lochia were normal, and she had no after-pains.

She was discharged from hospital on the ninth day (at her own request).

Review and Notice of Book.

CLINICAL MANUAL OF MENTAL DISEASES.

By A. CAMPBELL CLARK, M.D., F.R.P.S.G. BAILLIERE, TINDALL, & COX, LONDON, 1897.

Now that the study of mental diseases has been incorporated amongst the compulsory subjects of a medical curriculum in Great Britain, it is probable that there will be a multiplication of text-books on this subject. Dr. Campbell Clark, as Superintendent of the Lanark County Asylum and as a Lecturer on Psychological Medicine in Glasgow, has acquired

the experience necessary to one who writes with authority on a specialised branch of medicine. Both students and practitioners will find his book an eminently readable one, in which the salient facts are grouped together and illustrated by a large amount of clinical material. Its chief defect is an absence of pathological data, which have been intentionally omitted, because he considers the morbid anatomy of brain disease to be in too nebulous and transitional a state for authoritative teaching.

The book forms a handsome volume in the University Series, and the illustrations are well selected and clearly executed. Exception may be taken to the example of alcoholic dementia, given in Plate VII, in which the patient's expression looks too intelligent for such a type. Nor does the text sufficiently explain the principle on which the charts for epileptic insanity at page 237 are constructed.

The author's definitions of terms like illusion, hallucination and delusion are pithy and comprehensive. An illusion he describes as a false perception by any of the senses of an object or stimulus; a hallucination as a false sense perception without a stimulus applied to the end organ of any of the senses; and an insane delusion as a false belief, the result of diseased mental action. At page 73 there is an interesting chart which gives the result of fifteen years' observation on the percentage of insanity of all ages, and of cases in which there is a hereditary predisposition. The author concludes that the maximum of insanity is reached in the fourth decade, between the ages of 31 and 40 years, and he computes the maximum of hereditary insanity as occurring before the age of twenty-five, after which heredity becomes a subordinate factor until the age of fifty, when it gradually rises in importance thereafter as age advances.

In an enumeration of moral causes of insanity, it seems scarcely appropriate to include such physical factors as hardship, exposure and surgical shock.

In discussing the question of the cases which are most likely to benefit by home treatment or by asylum treatment, Dr. Campbell Clark states that he has observed cases of acute mania are more successfully treated in private houses than cases of melancholia,—provided the resources are ample, i.e. money, accommodation, and opportunity for exercise in the open air. For cases in which tube-feeding is necessary, the author recommends milk and eggs in the proportion of one egg to seven ounces of milk. To this may be added finely-grated bismit and rum, which he finds preferable to whisky or brandy.

As regards the classification of insanity, the author has elected to keep an open mind, to be catholic and eclectic, and not to commit himself to any such cast-iron and imperfect classification as that promulgated in the latest edition of the Nomenclature of Diseases.

On page 100 there is a sentence rendered obscure by one word, quoted here in italics:—"A wide grasp of symptomological types is, of course, of fundamental importance, and if we can differentiate any of them, *e.g.*, chronic delusional insanity of systematic evolution, so clearly as to make *respiration* (?) easy and undoubted, without trenching on any other classification, so much the simpler and better." This leads one to mention a few minor blemishes regarding the use of certain words, *e.g.*, at p. 177 'temporal' for temporary; 'mentalizes' on p. 183; 'hypochondriac symptoms' and 'hypochondria' for hypochondriacal and hypochondriasis on p. 207; the use of 'to' for against in the phrase "a strong animus to her husband" on p. 221; the use of the expression 'to resume' on p. 252 instead of to sum up; "religiosity" on p. 228; 'puerperum' for puerperium on p. 331; 'motorial' for motor on p. 373; 'uniformality' for uniformity on p. 393; 'to establish the *bonâ-fide* of the man' on p. 447, where *bona fides* would have been more accurate.

The author classes katatonia and catalepsy along with melancholia; indeed, he doubts whether katatonia can be differentiated from melancholic stupor on the one hand, or anergic stupor on the other. It is open to question if it would not be better, judging from the symptoms, to include katatonia under the heading of "States of Mental Alternation," as has been done by Clouston in his "Clinical Lectures on Mental Diseases." Catalepsy, on the other hand, is an intermittent neurosis, and, according to the author's own description, it is merely an intermittent phase of mental stupor, with or without melancholia. It may occur as a symptom of anergic or epileptic stupor, or of the stupor of masturbation. In ordinary medical textbooks, catalepsy is more usually associated with hysteria. The chapter on Chronic Progressive Delusional Insanity is a particularly good one, and the emphasis on systematic evolution should be of use to the alienist in arranging many cases of the monomania or obsession of suspicion, persecution, unseen agency, pride and grandeur. *Folie circulaire* is included in the section on Mania. Here, again, one is in doubt as to whether this form of disease would not more appropriately be grouped amongst 'States of Mental Alternation.' But the mere arrangement is a trifle compared with the author's description of the condition, which is:—"Excitement, depression, and *insanity* are the three phases of the circle." And again, "early alternations of mania, melancholia and stupor." Compare this with Clouston's definition:—"Regularly alternating and recurring periods of mental exaltation, depression, and *sanity*." Also in Hack Tuke's "Dictionary of Psychological Medicine" *folie circulaire* it is defined as "In regular succession, two opposite mental conditions, one characterised by greater or less

exaltation, the other by depression, each state being generally separated from the other by a longer or shorter period of a *normal mental condition*, which in time becomes more or less impaired."

In fairness to the author, however, we must quote Hack Tuke's extract from the writings of Falret père, of the Salpêtrière, who was a distinguished pioneer in the elucidation of this disease. "It is a special form," Falret says, "which we call 'circular,' and which consists, not as has been frequently said in a change of mania into melancholia separated by a more or less prolonged lucid interval, but in the change from maniacal excitement—simple over-activity of all the faculties—into mental torpor." The truth is that both the varieties described by Clouston and by Clark exist,—in the one case there is an appreciable period of mental equilibrium, whereas in the other this is masked by stupor or mental torpor. The author's mistake lies in his not having demonstrated to the student this apparent discrepancy, in not having described the variety which has a lucid interval as an integral part of the cycle.

In the chapter on General Paralysis of the Insane, it is stated that the ordinary type of the disease has changed of late years. The stage of exaltation is usually more subdued, and the congestive or apoplectic seizures are less common, whereas degenerative changes and negative symptoms are more frequent. In this respect the author's experience seems to coincide with that of many other asylum superintendents; but it must not be supposed that characteristic cases with grandiose delusions and maniacal excitement are no longer of common occurrence. No mention is made of the rarity of this disease amongst Asiatics, though there is an allusion to the Celt and the Negro not being subject to it in their native state, when unsophisticated by contact with civilization.

There is not space to discuss the chapters on epileptic, alcoholic, puerperal and allied insanities, &c.; but attention may be directed to the chapters on the backward and feeble-minded and on idiocy and imbecility, which contain many of the interesting data collected by the Joint Committee appointed by the British and British Medical Associations, and other societies to inquire into the mental and physical condition of childhood, as observed amongst the pupils of public, elementary and other schools.

In the concluding chapter on the legal and civil aspects of mental disease, the author has done well to insert copies of the lunacy forms in use in England, Scotland, and Ireland, and also to insist on the necessity of filling them in with care, accuracy, and commonsense,—simple precautions which are so often ignored by both medical men and committing officers in India.

Current Medical Literature.

MEDICINE.

SUPPOSED IMMUNITY TO ENTERIC FEVER OF NATIVES OF INDIA. (Surgn.-Major S. F. FREYER, A.M.S., *British Medical Journal*).—Seven hospital servants were tested by the Metchnikoff-Widal blood test and were found to be immune, while a sweeper who had suffered from five days' continuous fever (considered to be mild enteric fever) gave the re-action characteristic of the disease on the second day of the illness. To test whether immunity exists at birth, three infants at the breast—from 6 to 10 months old—were tested, and none showed immunity. Then five children—from 2 to 4 years old—were examined, and a boy of 4 alone showed no re-action. Lastly, six boys from 10—13 were tested, and 5 gave the re-action of immunity, and 1 no re-action.

This, among other facts, would help to point to the undoubted prevalence of the disease among native followers, "and in such intensity that only very few of the youngest children escape the disease." These facts give strong support to the impression so widespread among medical men in India that immunity is generally acquired after birth by an attack of the disease, and if protection is not conferred sufficiently in early life it is gained by a mild attack later on. The blood test employed had been proved to be reliable by employment in 30 odd cases of undoubted enteric fever under the writer's care, and it failed to give positive results when applied in cases which were suspiciously like enteric fever on admission, but which turned out later to be sun-fever.

CAN BERI-BERI BE CAUSED BY FOOD-SUPPLIES FROM COUNTRIES WHERE BERI-BERI IS ENDEMIC? (NEIL MACLEOD, *British Medical Journal*).—While overcrowding is acknowledged to be a marked predisposing cause of the disease, the writer describes an outbreak on board ship which seems to leave no doubt that a contaminated food-supply alone will undoubtedly cause the disease occasionally. In an editorial in the same issue, it is remarked that the disease is a place-disease rather than a food-disease. It has been again and again imported into places previously free of the disease from infected spots. And even certain ships become known as beri-beri ships from the fact that, voyage after voyage, some of their crews are attacked by the disease. But the conclusion from Macleod's paper is that an infected food-supply may communicate beri-beri.

SPINAL IRRITATION. (H. T. PATRICK, *Medicine*).—The author deprecates the use of this term altogether as utterly misleading; for, in a large proportion of the cases, neither the cord, its membranes, nor the spinal column are im-

plicated, and the application of the term to cases characterised by pain and tenderness along the spine—so commonly observed in "nervous" people—tends to foster the idea that the condition is a morbid entity instead of being merely a minor symptom of neurasthenia, hysteria, or hypochondriasis. He insists that so-called spinal irritation is not due to any permanent condition of the cord or spinal column, and considers that this is borne out by the fact that the hyperæsthetic points tend to undergo rapid shifting. The patient can locate them only about as accurately as a well person can locate a point on his back previously touched. If the tender spots be marked with a soft pencil where located by the patient, and then if the examination be directed elsewhere for five or ten minutes—e.g., to the chest, abdomen, extremities,—on returning to the spine it will now be found that different points will be indicated as tender on pressure, often from $\frac{1}{2}$ —2" away from the spot originally indicated by the patient. Hence the tenderness cannot be caused by any definite pathological condition of the underlying structures, for in that case there would be no such shifting as is observed. The degree of shifting corresponds just about to that found in pressing over the spine of a healthy individual, and therefore it may reasonably be concluded that it is due to the lack of absolute accuracy of the sensorium normally present in localising sensations. He urges that the shifting of the tender points demonstrates the functional and entirely cortical nature of the condition.

TREATMENT OF ANGINA PECTORIS. (W. OSLER, *New York Medical Journal*).—Co-existent constitutional disease, or the presence of valvular lesion, should be examined for. Mental worry should be avoided. Moderate exercise is beneficial. Diet is of the utmost importance,—often the amount requires to be restricted, and those articles causing fermentation and flatulence forbidden. As to drugs, the iodides check and modify the progress of arterio-sclerosis and lower blood-pressure. The potassium or sodium iodide should be administered for these purposes in doses of grs. x—xv, thrice daily. Perseverance with the drug for some time is essential. The iodides, however, are contra-indicated in cases with advanced arterial degeneration, dilated heart or interstitial nephritis. They act best in the cases of robust, middle-aged persons, in whom angina is the only symptom. Nitrite of amyl for the paroxysm, and nitroglycerine regularly in all cases of persistent high tension, are of much value. Often these drugs fail because given in insufficient doses: they should be pushed until the characteristic flushing and head-throbbing are produced. Syncope should be combated with spt. ammon. aromat., Hoffman's anodyne, ether, or camphor. When these fail, Osler would not hesitate to puncture the heart, which some-

times arouses to quite vigorous action a dilated and paretic organ. Strychnine and precordial blisters often act well in the chronic condition with its recurring attacks of cardiac asthma and feebleness.

VARIETIES OF RHEUMATOID ARTHRITIS. (GOLDTHWAIT, *Boston Medical and Surgical Journal*).—The differentiation of the true rheumatoid arthritis from osteo-arthritis is of much importance in the treatment of the condition present. Rheumatoid arthritis is much more acute; occurs in middle and advanced life mainly, but in early life as well; during the acute stage, the joints show a spindle-shaped swelling which, subsiding, leaves the joint much atrophied and occasionally ankylosed. For these cases manipulation of the joints, after all acute symptoms have gone, is recommended. Osteo-arthritis is much more chronic, occurring only in middle-life or old age, and is characterised by proliferation of the articular cartilage and node-formation about the joints. These cases should not be manipulated, as injury increases the more rapid development of the cartilaginous changes. Instead, protection and immobilization are recommended.

CHRONIC URTICARIA. (G. T. JACKSON, *New York Medical Journal*).—Although generally cases of acute urticaria yield readily to such simple measures as dieting, rhubarb and soda, and either an alkaline or acid lotion, yet the disease shows a recurring tendency in many cases, and this constantly repeated outbreak of wheals constitutes chronic urticaria,—a condition which may last for months or years. Among the causes of the chronic as of the acute condition, gastric or intestinal derangements head the list. Probably a partial toxæmia results from the circulation of a "ptomaine" resulting from imperfect digestive processes. A like toxic condition occurring in the course of diabetes, gout, rheumatism, alcoholism, certain drug intoxications, pregnancy, and malarial cachexia may cause the disease. Again, it occurs frequently in neuropathic conditions and in hysteria and Basedow's disease, and also in the nervous depression produced by malaria. The nocturnal character of many cases would tend to point to the natural exhaustion of nervous energy expended during the day, permitting of the particular toxin present being able to overcome the resistance to its action. Again, other cases are excited by temperature changes—warmth of bed, &c. In many cases an external irritation produces the eruption. The treatment should be first directed to correcting errors in diet and general hygiene; calomel or rhubarb and soda for bowel-regulation; and iron, with or without arsenic and strychnia, or Fellows's Syrup, as tonics are useful. Tea, coffee and rich soups should be forbidden. Milk, where the patient

can digest it, for a week or two may be made the principal article of diet. All pastry, cake, pork, veal, hot girdle-cakes, fresh bread, oatmeal, all fried viands or anything which the individual patient has found to disagree should be interdicted. Not more than three or four articles of meat at one meal should be allowed. Where the general nutrition is low, eggs—raw or slightly cooked—may be freely given, both with and between meals. As to drugs, salol appears to do harm. Sodii salicylas was occasionally of benefit. Menthol, internally, gr. i in ol. amygd. dulc., six times a day, checked the eruption in one case for a fortnight. Local treatment is important. Soda or vinegar baths at bedtime often enable the patient to sleep. They should be tepid, as hot baths often make the eruption worse. Salt or sea baths are often very useful. Extr. hamamelis gives relief to some, as also may a spray of alcohol, Eau de Cologne and chloroform. When baths are used, the skin should be dried by dabbing, not rubbing, and should then be dredged with starch powder. Circumcision (?) has been recommended in the supposition that the disease is reflex. Quinine should be exhibited in malarial cases, and as a nerve tonic. Iodide of potassium—grs. iii, t. d. s.—has been occasionally found very useful.

To sum up, do all you can to improve the general condition, especially by care as to diet and exercise; give alkaline or acid baths—which-ever the patient finds most relieving—and rely on these rather than any specific mode of treatment. In many cases a change of air is the only thing which cures chronic urticaria.

MORPHINISM. Erlenmeyer (*Le Progrès Médical*) noticed that sudden deprivation of a morphine maniac's drug induces symptoms of hyperacid dyspepsia, and on investigation excess of HCl was found present in the stomach. The cause of this phenomenon appears to be the excretion into the stomach of morphine injected hypodermically; and the drug then narcotises the gastric glands, inhibiting their secretions and lowering the gastric nerve-sensibility. The converse occurs on cutting off the morphine-supply from the patient, and an excess of acid is poured forth on the hypersensitive nerve-endings, producing the symptoms of gastric disorder and of reflex nervous disturbances. To counteract this, the writer uses small doses of bicarbonate of soda.

NIGHT SWEATS OF PHTHISIS. (COMBEMALL and DESCHEEMAKER, *Rev. de Thérap. Méd. Chir.*).—From 15–30 grs. each night of sulphonal is reported to diminish both the night sweats and cough in phthisis. In very advanced stages of the disease, the influence of the drug over the sweat is not marked.

C. H. BEDFORD, D. SC., M.D. (EDIN.)

Vital Statistics & Sanitation.

A SHORT REPORT ON THE PLAGUE IN BOMBAY AND THE MEASURES TAKEN TO SUPPRESS IT.

(Continued from page 356.)

28. *Chawls*.—In these narrow streets the houses run up to the height of six storeys, and in some of them, called chawls, as many as 400 to 600 persons find accommodation. A brief description of one of these chawls will suffice. On the ground floor is a narrow central passage about 3 feet wide with mud floor running the entire length of the building. At one end of this passage is the opening into the street: at the other is a latrine common to the floor on the one side and the fresh water hydrant on the other. From this central passage doors open on each side into small cubicles. The floor of the cubicles are of mud, the partitions of wood or of small sticks plastered with mud. There is no window, no chimney, no light or ventilation, save such as penetrate through the doorway from the dimly-lighted central passage. In the bright light of an Indian sun at mid-day, so dark are they that it is impossible to distinguish the presence of a second person in the room, and small oil lamps have to be used when cooking has to be done. The cubicles average about ten feet square and eight to ten feet high. The number of persons who sleep in them is usually limited by the floor space, for on a rainy night, sleeping out of doors being impossible, they lie like sardines in a tin. The expression "usually limited" is used advisedly, for in some cubicles a small pigeon loft about six feet from the ground has been built, access to which is obtained by means of a bamboo ladder, and here in a low garret sleeping accommodation is found for still more. Imagine five more storeys of this description connected by narrow staircases, and you have a picture of

which is derived from the Tansa Lake, is—and the house connections are numerous—perhaps far too numerous.

30. *Severage* is carried off by underground sewers, and is discharged into the sea at Worli, on the western side of the island. There is a pumping station at the outfall.

Prior to the passing of the Epidemic Diseases Act, Act III of 4th February 1897, and the formation of the Plague Committee, what could be done was done by the Health Officer, Brigade-Surgeon-Lieutenant-Colonel T. S. Weir, and his assistants to stamp out the plague. Having regard to the fact of the tenacity with which plague clings to a place when once introduced, and the difficulty with which it is finally ousted, there can be little doubt that the most important sanitary measure throughout the epidemic was at this time carried out by the people themselves. Panic-stricken they fled in thousands, thus reducing the population of the city by one-third, or possibly almost by one-half. The effect of this measure was three-fold—(1) overcrowding was diminished, (2) the amount of material which might be infected was lessened, and with this (3) the number of infected cases, thus enabling the latter more capable of being attended to in hospital and on sanitary principles. It is a matter of regret that this measure, so useful to Bombay, resulted from the want of certain restriction in a spread of the disease throughout the Bombay Presidency. The epidemic, however, assumed such dimensions as to call for a special organisation for its repression. Accordingly, the Bombay Government appointed a "Plague Committee," and endowed it with complete powers under the Epidemic Diseases Act. This Committee began work on 1st March 1897. Its composition was as follows:—

Brigadier-General W. F. Gatacre, C.B., D.S.O.	President.
C. H. P. Snow, Esq., I.C.S., Municipal Commissioner.	
Surgeon-Major H. P. Dimmock, I.M.S.	Members.
C. C. James, Esq., Executive Engineer, Municipality.	

Dr. Weir was appointed Special Medical Officer on duty with this Committee.

The Committee went to work immediately, a central office was secured, the services of a senior Military Officer were obtained as Secretary with two Military Officers as Assistant Secretaries, and a full staff of accountants, clerks, type-writers, surveyors, etc., were appointed.

In order to decentralize the work, the city and island of Bombay were divided into ten districts, each district containing two or more sections. Special Medical Officers with full executive powers were appointed to these districts under the immediate supervision of Dr. Weir. To each District Medical Officer was given a central and sectional offices, and necessary office staff. Lists were prepared showing the number of houses and population in each section and district.

(To be continued.)

Correspondence.

[The Editor is not responsible for the opinions and statements]

THE INDIAN ARMY NURSING SERVICE: A REPLY.

TO THE EDITOR, "INDIAN MEDICAL GAZETTE."

* See Editor's remark at end of this letter.

SIR,—The article in the July number of this paper on the Indian Army Nursing Service was deeply interesting but somewhat one-sided, and characterised throughout by an unfortunate lack of refinement in tone.

There are several points in the paper to which exception might be taken, and there are certain considerations which do not appear to have occurred to the writer, whilst preparing this somewhat acrimonious attack on the Nursing Service.

But before proceeding to the discussion of individual points, let it at once be granted that the Indian Nursing Service as at present constituted is far from perfect, and that there is a fair opening for perfectly legitimate criticism of many existing arrangements.

But with all its defects, no one will deny that the Service has done some good work. Its weakest points are:—

(a) The admission of unsuitable candidates.

(b) The insufficient number of Sisters for the work they have to do.

Even if the maximum number of Sisters were maintained (which is by no means the case at present, especially in the Madras Presidency), there would still be more work than they can undertake, if a high standard of efficiency is to be kept up.

But the main question raised by the writer last month was not the efficiency of the Nursing Service *per se*, but the relative efficiency of hospital work done with the Nursing Sister, or without her.

The tribunal which is to settle this momentous question, according to the previous writer, is a somewhat curious and highly original creation of his inventive mind. Let us may inadvertently misrepresent his views, here are his *ipsissima verba*:—"Which does the British sick soldier in India prefer, and which does the Army Doctor honestly recommend—the sympathetic care and help of company comrades and the attendance of the Orderly Warrant Medical Officer—or consignment to the tender manipulations of a Sister who . . . may be moved to meet contingencies as they arise, by the administration of some medicament which her own *poor* (the italics are the present writer's) experience suggests?" Now it is perfectly obvious and equally certain, that were either the average Army Doctor or the ordinary British soldier asked whether he approved of the Nursing Sister or not, the answer would unhesitatingly be in the negative.

Mr. Thomas Atkins, unless his illness be so grave as to render him oblivious of his surroundings, most strongly and emphatically objects to "them gals messin' about." They confiscate his smuggled pipe and that cherished bottle of spirits hidden under his pillow. They raise the tariff and cause uncertainty in the supply of forbidden tarts and pies; and worse than all else, when he is marked "Bed" in a Sister's ward, in bed he has to stay, with none of those promiscuous in the verandah and friendly pipes, which he can enjoy to his heart's content, under the *regime* of the Warrant Medical Officer and the "sympathetic comrade."

To those who know the working of a Military Hospital as it really is, the beautiful picture of the "sympathetic and helpful comrade" is indeed delicious. In the present writer's experience, an enteric case, with a temperature of nearly 105°, was assisted by two orderlies to walk out and sit in a chair in the verandah. When remonstrated with the sympathetic comrades replied—"Ah thort as 'ow it ud be a bit cooler for 'im in the verander." No one will deny that this showed great sympathy with the patient's forlorn condition, but unhappily his life was forfeited.

And many instances are on record of the orderlies who have fed hungry enterics on smuggled dainties, or who have tucked themselves up and slept sweetly on night duty, leaving the thirsty and delirious patient's moans unanswered, save by a "sympathetic" (?) snore.

By all means, let us have this excellent comrade, but let his help be rendered efficient, and his sympathy educated, by a thorough training under a highly-trained nurse. How is the Orderly Warrant Medical Officer to teach what he himself has never learned?

Lastly, the previous writer expressed a pathetic anxiety lest the Nursing Sister should treat a patient with "some medicament suggested by her own *poor* experience." Now the author of such a statement is condemned out of his own mouth. It is just the woman of "poor" experience, and that woman alone, who would presume to treat a patient on her own responsibility.

The highly-trained, well educated woman (who alone ought to be admitted to the ranks of the Indian Nursing Service) is too

conscious of the awful responsibility resting on her to venture on such a step.

Let the Indian Nursing Service be reformed. By more careful selection secure only competent nurses, and let an adequate staff be maintained. But let the question of the retention of the Service be decided—not by the inclination of doctor or patient—but after thorough investigation of the whole subject by a committee of experts. Let this committee not content itself with the consideration of fallacious and misleading statistics of “enteric” recoveries and deaths, but let the members pay surprise visits at all hours of the day and night to those wards nursed by sisters, and by virtuous comrades, respectively. If the Sisters are worth their salt (and only such should be retained), the verdict will unhesitatingly be given in favour of that scene of orderliness and peace, efficiently supervised by women who fully realise the obligations of their “high and holy calling.”

* [There is no such article in the July number of the *I. M. G.* The only article on Nursing is confined strictly to midwives.—ED.]

A MEDIAN INCISOR TOOTH.

TO THE EDITOR, “INDIAN MEDICAL GAZETTE.”

SIR,—I would like to ask your readers for some reference to a case of a median incisor tooth if any of them are acquainted with one. Last year a prisoner in my jail was found to have what appeared to be one in the upper jaw. Situated between the two central incisors, which were very long and tush-like, and had their enamel worn away half way up, was a shorter rounded peg-like tooth which also had its enamel worn away for about half its length, and there were three upper molars on the right and only two on the left side, but there were *five* teeth in front of the canines. Below the teeth were normal except that there were only two molars on the right side. The man, a Kurmi, aged 40 years, said that the central tooth appeared after the two central incisors in boyhood. There was no family history of anything of the kind.

In a female Ganjoo (Kharwary), aged 17 years, I also found a conical tooth growing into the mouth from behind the left upper central incisor. The other incisors were normal. I can find no reference to a median incisor tooth in Quain's Anatomy or any other book at hand. I would like to mention that the commonly accepted notion of the teeth being more regularly arranged, and the wisdom teeth being less cramped and not so frequently absent in the lower as compared with the higher human races derives little support from an examination of the aboriginal races. The teeth are often very irregular, while the frequent absence of wisdom teeth and their erratic and often much delayed appearance strikes one very forcibly.

I am, &c.,

RANCHI,
The 16th Sept. 1897. }

F. P. MAYNARD,
Surgn.-Capt., I. M. S.

{Supernumerary teeth are more or less conical, as a rule, with stunted fangs. They are usually found in the front of the mouth, in the neighbourhood of the upper permanent incisors. Dr. Ashley Barrett, in his “Dental Surgery,” states that:—“Irregularity in the arrangement of the permanent teeth is amongst civilized races greatly on the increase, and its cause may be found in the lessened work thrown upon the organs of mastication by the appliances and requirements of modern life, whence results decreased development of both teeth and jaws. But while the shape, size and number of the teeth has not undergone much change, with the exception of the wisdom-tooth, which is more variable and less developed than in the skulls of earlier date, we find that the development of the maxillary bones is frequently far less complete than in the older periods of man's history. So, with a stunted alveolus and teeth of normal size, overlapping and crowding of the latter too often ensue.”—ED.]

The Services.

ASSAM GAZETTE.

APPOINTMENTS

Hospital Assistant D. C. SEN, to the medical charge of the dispensary at Ponchuganj, Sylhet.
Hospital Assistant G. C. DHAR, to the medical charge of the coolie depot at Fenchuganj, Sylhet.
Hospital Assistant H. K. GUPTA to the medical charge of the Darrangiri Dispensary, Goalpara District.
Hospital Assistant N. K. BHATTACHARYA, to the Kamrup District as a supernumerary for duty under the orders of the Civil Surgeon.
Hospital Assistant K. C. DAS, civil medical charge of Tura, Garo Hills District, in addition to his other duties.

BOMBAY GAZETTE.

APPOINTMENTS.

Brigade-Surgeon-Lieutenant-Colonel G. W. R. HAY, temporary rank of Surgeon-Colonel, while officiating as P. M. O., Bombay and Aden Districts. To act as Surgeon-General with the Government of Bombay.

Surgeon-Lieutenant-Colonel W. K. HATCH, to be Principal, Grant Medical College, Bombay.

Surgeon Major K. S. NARIMAN, charge of Office of Deputy Sanitary Commissioner, Gujarat Registration District.

Surgeon-Major D. C. DAVIDSON, Superintendent of Mahableshwar.

Surgeon-Major C. MONKS, Civil Surgeon, Satara, but to continue to act as Surgeon, Gokaldas Tejpal Native General Hospital, Bombay.

Surgeon-Lieutenant-Colonel O. H. CHANNER, to act as Civil Surgeon and District Medical Officer, in addition to his own duties.

Surgeon-Captain H. HERBERT, to be Professor of Ophthalmic Surgery and Professor of Comparative Anatomy and Zoology, Grant Medical College, Bombay.

Surgeon-Major A. E. J. CHOLY, A.M.S., to act as Medical Officer on the Personal Staff of H. E. the Governor.

Surgeon-Captain B. H. F. LEUMANN, services at disposal of Bombay Plague Committee, for Plague Flying Column No. 1.

Surgeon-Captain J. B. SMITH, in charge of Plague Flying Column No. 2.

Surgeon-Captain W. C. SPRAGUE, placed on plague duty in the Kolaba District.

Assistant-Surgeon R. J. KAPADIA, has been appointed to the medical charge of Plague Flying Column No. 3.

Assistant-Surgeon V. D. MERCHANT, appointed Assistant to Surgeon-Captain B. H. F. Leumann, Plague Flying Column No. 1.

Assistant-Surgeon G. G. BOPARDIKAR, to act as Civil Surgeon, Karwar.

Assistant-Surgeon S. M. METHA, Plague Flying Column No. 1. Later on special duty at Lonavli under M. Haifkine.

Assistant-Surgeon M. A. POSTWALLA, Railway Inspection at Kalyan.

Assistant-Surgeon V. B. KARANDIKAR, Pandharpur Dispensary.

Assistant-Surgeon F. A. MOOS, to act as Civil Surgeon of Thana, in addition to his own duties.

TRANSFERS.

Surgeon-Lieutenant-Colonel J. S. WILKINS, D.S.O., services at the disposal of the Government of India.

Surgeon-Major H. E. DEANE, A.M.S., services replaced at disposal of the Government of India.

The services of the following officers have been replaced at the disposal of the Government of India:—

Surgeon-Captains—

C. T. HUDSON.
J. H. RIVERS, A.M.S.
C. M. FLEURY, A.M.S.
V. B. BENNETT.

Surgeon-Lieutenants—

W. W. CLEMESHA.
H. A. F. KNAPTON.
A. W. F. KING.

The services of the undermentioned medical officers are placed temporarily at the disposal of the Government of Bombay for Plague duty:—

Surgeon-Captain—

D. J. COLLINS, A.M.S.

Surgeon-Lieutenants—

C. K. MOROAN, A.M.S.
H. A. L. HOWELL, A.M.S.
E. F. E. BAINES.
G. O. F. SEALY.
J. C. ROBERTSON (Bengal).

Assistant-Surgeon P. V. SHIKARE, services at disposal of the Chairman, Bombay Plague Committee.

Drs. D. M. SANOLEY and C. E. CLAXTON, services engaged for plague duty. The former posted to Sutna, and the latter to Bundikori.

LEAVE.

Surgeon-Lieutenant H. A. D. DICKSON, one year's leave on medical certificate.

Assistant-Surgeon B. H. NANAVATI, Teacher of Surgery and Midwifery, Behramji Jijibhai Medical School, Ahmedabad, allowed an extension of leave on medical certificate up to 29th December 1897.

RETIREMENT.

Honorary Surgeon-Captain A. MULLEN, Senior Assistant-Surgeon, retired from the service on the 22nd June.

Surgn.-Capt. W. J. Buchanan, Buxar—Surgn.-Maj. J. H. Tull-
Walsh, Midnapur—Surgn.-Capt. F. P. Maynard, Ranchi—Surgn.-
Capt. C. H. Bedford, Calcutta—Kedarnath Das, M.D., Calcutta—
C. Banks, M.D., Calcutta—A. Powell, M.Ch., B.A., Cachar—Surgn.-
Maj. G. M. Miles, Sitapur—Surgn.-Lieut.-Col. H. P. Esmonde-
White, Travancore—Burroughs, Wellcome & Co., London.

(Contributors of original articles will receive twenty-five copies of their papers.)

Original Communications.

THE LOWER BENGAL (BURDWAN) EPIDEMIC FEVER REVIEWED AND COMPARED WITH THE PRESENT ASSAM EPIDEMIC MALARIAL FEVER (KALAZAR).

By SURGN-CAPT. LEONARD ROGERS, I.M.S., M.B., B.S.
(LOND.); F.R.C.S (ENG.)

THE epidemic of malarial fever which spread over a large part of Lower Bengal in the period comprised between the years 1850 and 1875 excited an immense amount of controversy while it lasted, yet it may be safely asserted that in spite of the numerous theories which were put forward to account for the phenomena witnessed, no complete and satisfactory explanation of the epidemic considered as a whole has ever been propounded. Nor is this surprising when it is considered that at the time of the controversy the prevalent ideas with regard to the nature of malarial fevers were of the vaguest kind and the existence of the malarial organism was not then discovered, and it was not until a considerably later period that any attention was directed to it in India.

In the course of my recent investigation of the epidemic fever of Assam, which is locally known under the name of "Kala-azar," I was so much struck by the close resemblance between this latter outbreak of a spreading fever in Assam with that known in Bengal under the name of the "Burdwan fever," that I at first thought the two epidemics might possibly be continuous. This led to an examination of the old Bengal reports and other literature on the subject, much of which was very kindly obtained for me by Mr. Cotton, the Chief Commissioner of Assam. The result was that, although the two outbreaks were found to be independent of each other, and differ somewhat in the type of fever as is shown in section VIII of my report* on the Assam epidemic, yet the resemblance between the two phenomena are so minute that I am convinced that they are of precisely the same nature and have a similar origin. As, moreover, the Assam epidemic is the first instance of this nature, which has been investigated in the light of modern pathological knowledge, the results obtained have an important bearing on the true nature of the Lower Bengal outbreak. It will then I hope not be without interest to briefly review the former epidemic in the light of modern knowledge, especially as these epidemics have been responsible for a fearful yearly mortality extending over a period

of half a century, and in some places completely depopulating whole tracts of country, while there is good reason to believe that in former centuries no less destructive epidemics of a similar nature have occurred, while the extraordinary influences which gave rise to these may at any time recur with a like result.

I propose in this paper firstly, to give a very brief outline of the Lower Bengal epidemic as a whole; secondly, to discuss the theories which have previously been advanced to explain it and to show their inadequacy; and thirdly, after pointing out the real origin of the epidemic as far as it can now be ascertained from the early records, to give what I believe to be the true explanation of the occurrence as seen from the present standpoint of scientific knowledge. The Assam epidemic will only be referred to in as far as it illustrates and confirms the facts and reasoning with regard to the Burdwan fever, but no attempt will be made here to give any systematic account of "kala-azar" as this has been fully done in my report on the subject.

A general idea of the epidemic may best be conveyed by the following abstracts from the Bengal census report of 1881:—

"The only division of Bengal which shows a decrease (in the population) is one which a quarter of a century ago was considered one of the most salubrious in the province. The history of the decrease of the population in the Burdwan division is the history of the famous Burdwan fever. It is true that this terrible epidemic did not claim so many victims in the decade which has just elapsed as in that which preceded it, but the ravages of the disease have not yet been repaired, the ruined villages have not yet been rebuilt, jungle still flourishes where populous hamlets once stood, and while many of those who fled before the fever have not returned, the impaired powers of the survivors have not sufficed to fill the smiling land with a new population. How this terrible disease was generated and how it extended, are questions still debated among those most competent to give an opinion on the subject; and one solution of the difficulty is that a change took place in the characteristics of the fever during the twelve years that it prevailed, so that the disease which was so fatal in 1873 was not the same as that which decimated the population in 1862. That it was a malarious fever is universally admitted, and that by some means or other it travelled steadily in a general direction from east to west is beyond controversy; but here unanimity ceases." After quoting the Sanitary Commissioner for Bengal, who spent several months of two years in studying the disease in the affected districts, and whose invaluable report will be referred to again later, as writing in 1874 "the fever, originally malarious, acquired either in Jessore or Nadia

* The report has just been published by the Assam Secretariat Press and can be obtained either from them or from Messrs. Thacker, Spink & Co., Calcutta.

contagious properties," in support of which he urged that the advance of the epidemic followed the main roads and the chief lines of traffic and, that it did not spread in any direction where means of communication did not exist; while, on the other hand, other authorities assert that the fever though malarious was not contagious, the writer sums up: "On the whole, it may probably be concluded that the disease was a malarious non-contagious fever; that its advance along roads and lines of communications was a coincidence, merely the fact being that it was not communicated by travellers, but that it found in the large villages and bazaars, which are inseparable from lines of traffic and centres of trade, a set of insanitary conditions most favourable to its development, that it was a malarious fever rendered malignant wherever specially evil conditions favoured its development, and that it travelled steadily in a given direction in obedience to some law which has not yet been discovered, unless that of a general and progressive obstruction of drainage over the whole affected area provides a satisfactory solution of the difficulty."

It will be seen from the above paragraph that the obstructed drainage theory failing to explain the facts, the writer in order to escape admitting that a purely malarious fever may become infectious has to fall back on supposition which necessitates the admission that the disease arose *de novo* in each of the places that it affected, which opinion in these days needs scarcely be seriously discussed. To continue the quotation:—

"That the fever did travel is no matter for doubt. Like the waves of a flowing tide it touched a place one year and receded, reached it again next year with greater force and again receded, repeating this process until the country was wholly submerged and the tide passed further on. During the first year of its invasion the fever was mild; there was a simultaneous increase of the general fever, endemic fever, and a subsidence of both, usual at the end of the fever season. In the second year the fever began earlier than the ordinary country fever and earlier than the epidemic fever of the year before previous year; it also lasted longer and caused greater mortality. During the third year the disease was marked by still larger fatality both from primary attacks and secondary complications, the systems of those who had survived the two previous years being now so saturated with malaria that they had little power to resist the attacks of the fever and fell rapid victims to it. During the fourth, fifth and sixth years,—six years being the average duration of the fever in any place,—there was a general and slow recovery, the fever in each successive year attacked fewer persons, was of a less fatal type, and prevailed for a shorter period, finally disappearing altogether in the

seventh year, but leaving many of its victims with a permanently enlarged spleen and other complications to indicate the trial which the system had undergone.

Every word of the last paragraph is literally true of the Assam epidemic called "Kala-azar," although it was written before the latter had attracted any attention. Let us now see what was the general course of the Lower Bengal epidemic fever, which is a much better name than "The Burdwan Fever" as this was only one of several districts that it effected. To continue the above quotation:—

"This fever, as has been said above, invaded the Burdwan division from the East. It appears to have originated in the Eastern part of the Presidency Division some thirty years ago. Fever was very fatal in Jessore district in the years 1847 and 1848, and after a temporary cessation it broke out again in 1854-56. About this time it began to spread westward to Nadia and the 24-Parganas, and finally culminated in the severe epidemic which devastated those districts from 1857 to 1864. No notice of this fever seems to have been taken by the authorities until the end of 1861, although it prevailed in a most virulent form in Nadia from the end of 1856. Towards the end of 1861, however, its ravages in the Baraset subdivision and the northern portion of the 24-Parganas attracted the attention of Government, and efforts were made to combat it. A few months later measures of a similar kind were introduced in the Nadia district, and in all the three districts then included in the Presidency Division relief operations were continued till the fever died out in about 1864. Briefly stated, this fever was most severe in the rainy season and the winter of the years 1860 to 1862-63. In the winter of 1863-64 there was a perceptible improvement, and a radical change for the better in that of 1864-65.

"But while the epidemic was wearing itself out in the districts of the Presidency Division where it was first observed, it had spread slowly westward into those of the Burdwan division. The Burdwan district is separated from that of Nadia by the Bhagirati river, and the thannahs of Burdwan which abut on the river are these, *viz.*: Cutwa to the north, Parbasthali in the centre, and Culna to the south. It was in riverside villages of the Culna thannah that the first cases of the epidemic occurred in the year 1862. In 1863 the fever re-appeared in the Parbasthali and Culna thannahs, and attacking first the riverside villages on the river bank, advanced slowly inward, spreading also southward into the northern portion of Hughli. In 1864 and 1865 the fever moved still further westward both in Hughli and Burdwan and extended in a southerly direction through the former district to the boundaries of Howrah. The features of the epidemic in 1866 and 1867 were the same as in 1865, except that there was no further

extension in spread to the south in Hughli and Howrah. In 1868 and 1869 a great advance occurred, the town of Burdwan being invaded in the former year and the epidemic spreading far to the north and south, besides continuing its westerly progress. In 1870 its westward extension was not very great; but on the north it invaded Birbhum, and raged all along an extensive tract on the southern portion of the district, the left bank of the Adjai river. In the following year, 1871, the extent of its advance was unprecedented; for not only did it progress many miles to the westward in Burdwan, but it spread to the north and north-west in Birbhum, and appeared in a large tract of country on the north of Midnapore. By 1872 the utmost westerly limit was attained, for it was arrested by the high land lying in the extreme west of the district and along the Bankura border; but the Birbhum district was devastated still further north than in the previous year, and in the Midnapore district a great southern extension took place, enveloping almost the whole of the north-eastern portion of the district. In 1873 the fever made no further progress in Burdwan; and though still severe in the west, it was dying out gradually in those parts of the district where it had first been observed. In Hughli and Birbhum also there was some slight abatement, but in Midnapore and Howrah the mortality was twice as great as in the preceding year. The year 1874 may be taken as the last year of the epidemic in this division; from all quarters reports came that the fever was less fatal and less prevalent than in previous years. In 1875 the same facts were observed again, and what fever remained there wasted the virulence of the epidemic, and had all the characteristics of the ordinary seasonal malarious fever of the country."

The above extracts will be sufficient to give a general idea of the course of the epidemic, while those who are acquainted with the more recent Assam epidemic fever, or have read my report on the subject, will at once see the great similarity between the two outbreaks. Before passing on to consider the various explanations which have been given of the above described phenomena, it will be advisable to give some further facts with regard to the origin and termination of the Lower Bengal epidemic as any theory must take these into account if it is to be satisfactory.

The origin of the epidemic.

It has been already mentioned that the fever apparently arose in Jessore and spread from there to Nadia. The exact date at which it first attained to this power of spreading from one district to another is somewhat doubtful, as there appear to have been several local outbreaks of unusually severe malarial fever in

this district before it began to spread to other districts. Thus Dr. Elliot in his report, on the Burdwan fever published in 1863, writes: "A peculiar type of fever called by natives 'Jor Bekar,' of the same nature as that now prevalent in many of the large villages of the Burdwan and Nadia divisions, seems to have been prevalent in Jessore for many years previously to its first appearance in the district of Nadia. It appeared at Mahomedpore, a large village on the river Ellen Kallee, about 30 miles east of the station of Jessore, in the year 1824 or 1825; next at a place called Dalga, on the Cheetra Nuddee; then at Nuldanga, on the Baeng Nuddee, a few years later; and at Chashra, a damp, unhealthy village near Jessore, still known as an aguish spot, in the year 1831. The inhabitants of Gud Ghât, a large village twelve miles north of the station, suffered fearfully about the year 1855 or 1856, when many hundreds died before medical aid could be afforded them, and others fled panic-stricken from the place. It is probable that the same type of fever as was common in Rangpur, Dinajpur, Purneah, and some other districts which are now, I understand, pretty healthy."

This last sentence is of great importance as showing that in the middle of this century there was a virulent outbreak of fever in Dinajpur and Rangpur, similar to that of the seventies, which I have shown in my report on "Kala-azar" was the origin of the present Assam epidemic malarial fever.

Dr. Elliot continues: "From Jessore it would seem to have passed over to the contiguous district of Nadia about the year 1832 or 1833, attacking first the large and then populous village of Gudkhally, situated between the Hireekhal and the stagnant river Cobbaduck, twelve miles south of Jessore, on the public road leading to Calcutta. He then goes on to trace its slow spread from village to village year by year in this district and through the Nadia, Baraset and Hughli districts into the Burdwan division.

From an examination of the first Bengal sanitary report (1868) in which an account is given of some of the fever epidemics in Jessore and from other literature on the subject, it appears that in addition to the two outbreaks in 1824 and 1831, there were others in 1847-48 and 1854-55 in Jessore, which were attributed to the silting up of the Bhyrub river, which is described as "having formerly been a fine large river, but now much damaged by a bund thrown across it by the proprietor of an indigo concern," various effects to improve the state of this river are recorded. These various fever outbreaks appear to have extended more widely at each recurrence, and to have eventually culminated in the great epidemic, the general course of which has been just described, and which there is no doubt whatever originated in

Jessore. I have not been able to obtain any records of the rainfall in Jessore during these epidemic years, so it is impossible to say whether the primary cause of the outbreaks of fever was a succession of years of abnormal rainfall such as I have shown to have brought about the Rangpur-Assam epidemic, or whether it was the silting up of the Bhyrub river, which, undoubtedly occurred during the years of the epidemics. Very likely the physical changes in the drainage of the district brought about by the silting up of the river was one great factor in making the district more malarial, while the separate outbreaks in Jessore which culminated in the great Lower Bengal epidemic fever were largely influenced by variations in the rainfall in different years. This much at least is certain, that the epidemic did arise in Jessore, and that extraordinary physical changes were going on in the district at the time of its origin might very easily have brought about an increase in the prevalence and virulence of the ordinary malarial fever of that district, whilst, as I shall show presently, no such adequate cause, for the breaking out of the disease in successive years in the districts which were subsequently invaded, can be found.

The cessation of the epidemic.

Any explanation of the Lower Bengal epidemic fever must also satisfactorily account for the cessation of the spread of the epidemic as well as for its origin if it is correct. It has already been mentioned that the fever ceased to spread westward, when it reached the high rising ground of Chota Nagpur at the border of the Bankura district. It then altered its regular westward course and turned north-west into Birbhum, where it was stayed by the rising ground of the Sonthal Parganas, and south into Midnapore, where it spread as long as it found an alluvial soil, but failed to get a permanent footing on the dry porous laterite soil on which the town of Midnapore itself stands. It attacked places on the edge of the laterite, but for one year only, and after the usual seasonal abatement did not recur the next year as always did on alluvial soil, showing that the *materies morbi* did not get a footing in the laterite soil. This is a point of the utmost importance, but as extracts to prove it have been given in my Assam report, it need not be repeated here. The fact is very well illustrated in maps in Dr. Jackson's sanitary report for Bengal of 1873. Throughout its whole course then, the epidemic has been limited to alluvial soil, which is also essentially true of the Rangpur-Assam epidemic.

Former theories of the origin and nature of the Lower Bengal Epidemic Fever.

We see then that the epidemic arose in Jessore, probably by an increase of the virulence of the

ordinary fever of that very malarious district, brought about by physical changes in the drainage of the district, possibly intensified by an abnormal rainfall in certain years, and that from Jessore it spread slowly (from 5 to 10 miles a year) from one district to another for a period of over 20 years, and only died out when it reached the limits of the alluvial soil.

These facts can only be explained in one of two ways; either by a progressive physical change, such as increased waterlogging of the soil which extended in a wave over the affected districts coincidently with the spread of the fever; or by the admission that the fever acquired in Jessore such an increased intensity as to become slowly communicable directly or indirectly from person to person, its spread being only limited by the fact that an alluvial soil was necessary for its propagation.

The first mentioned explanation was that which was most commonly adopted during the prevalence of the epidemic, although towards its close, when the full facts concerning its spread were available, the theory of the infectiousness of the fever received some very strong support.

During the earlier periods of the epidemic certain other explanations were given such as Dr. Elliot's theory that "it is probable that a change from time to time occurs in the type of disease among the people, and that during cycles or periods": or that "of overcrowding, diminished food-supply, defective sanitary arrangements, etc.," of Dr. French, although this last observer looked on these as predisposing only, while he is certain that "it progresses steadily although slowly, it has followed, like a rolling wave, the chief roads or means of communication," and other theories too numerous to mention; of which it will suffice to say, that as there was no evidence that these sanitary conditions had changed to any extent during or shortly before the epidemic, they cannot explain the spread of the fever.

All the theories which attributed the spread of the fever to coincident physical changes in the districts attacked, considered this change to consist in a "waterlogging" of the country, but the ways in which they thought this had been brought about differed with each writer to such an extent that they were actually contradictory.

Thus the three main theories were:—

- (1) "A gradual elevation of the fever tracts from East to West" of Dr. David Wilkie;
- (2) A "river elevation above the intervening land" of Dr. Coates; and
- (3) A waterlogging of the districts by means of railways, embankments, roads and bunds confining the rivers and others obstructing certain watercourses.

Dr. Wilkie, who investigated the fever in Burdwan in 1873, concludes that "there is only one way out of the difficulty; the cause of the fever was a general one, it has entirely passed away or ceased to act," and he finds a solution

of the problem in the remark of the Commissioner of Burdwan that a line separated the healthy and unhealthy tracts "which is coincident with a gradual rise in the level of the soil from this line westward up to the level of Raiganj." This Dr. Wilkie suggests "may have been the terminal phenomenon of a process that had gone on over the whole district gradually from east to west," which caused the fever by obstructing the drainage until "by the end of 1872 this progressive elevation had advanced so far as to reach the high lands in the west, and south-west the fever may be said to have ceased, because the land wave could no longer obstruct the drainage." Apart from the fact that this ingenious theory does not cover the whole of the country affected by the epidemic, Dr. Wilkie produces no evidence that such a remarkable event ever occurred, beyond the quotation above given, while he does not attempt to explain how this extraordinary phenomenon was caused, or how it never affected the course of the rivers of the district traversed by it.

Dr. Coates in criticising Dr. Wilkie's theory writes, "The whole history of the formation of the Gangetic delta shows that elevations only occurred by depositions from above," and further on "I conclude, that, therefore, that since these rivers have been embanked, and spilling over the country prevented, a special and exceptional elevation of the fever tracts has not occurred. I cannot but believe that, had there been any upheaval it would have favoured health and not disease, yet the fever is distinctly malarial and connected with, if not entirely caused by, evaporation from a decomposing surface or subsoil." And he continues: "I can only understand this extra subsoil water evaporation to arise, not from land elevation but from river elevation above intervening land, and a consequent filtration outwards of this high level water towards the intervening low ground, and its evaporation in and around the villages there situated." He quotes two engineers one of whom writes: "The general bed of the Damuda is rising, that is silting up. The levels taken are of too recent a date to be relied on as data of permanent change. That Burdwan has materially elevated during the last century there is no evidence, but the present site is on a higher level than at a former period." The other engineer states that it appears that "the Bhagirathi, Matabanga, and Jellinghi have deteriorated in the last 50 years," but adds "it is quite possible that these may alternately deteriorate and improve again according to changes (which are great) in the main Ganges." Dr. Coates therefore suggests that the fever epidemic was due to the elevation above the surrounding country of these Gangetic delta rivers in succession from east to west.

This theory at least covers fairly accurately the area affected by the epidemic, but there is no evidence that these changes, which have been

taking place very slowly for centuries were accentuated during the few decades during which this epidemic fever raged. Moreover, such an elevation could only have been a very few feet at the outside, yet Dr. Coates further writes: "Those villages closest to the Bhagirathi river were not affected, but those at some distance inland. The former would be on higher ground." To a supposed elevation of these rivers by a few feet, then, is attributed an epidemic fever, which carried off over half a million people in twelve years from the Burdwan district alone. The fever, however, did not appear on each side of the rivers, as they silted up in succession, as must necessarily have been the case if this theory was true; but, on the contrary, it spread steadily west up to and across the rivers, which had no effect whatever on its spread, except that "if a broad river intervenes in the path of the fever its progress is checked for a time" (Dr. Jackson). This absence of any relation of the details of the spread of the fever to the supposed cause is sufficient proof against this explanation.

On the remaining theory which attributes the epidemic to the obstruction of drainage by railway embankments, roads, etc., a great deal has been written. That such obstructions are capable of producing local exacerbations of malarial fever is undoubted, but it is a very different thing to attribute such a widespread epidemic as that under consideration to such causes. The question is a very important one, and instances have been reported in Burdwan and other districts in which local obstructions of drainage were followed by an increase of fever, which decreased on their removal. It is not, however, surprising that such instances should have been forthcoming during the long period over which the epidemic lasted in a country in which the greater part of the agriculture depends on the water being retained in the fields during a certain period by means of such bunds, and doubtless such cases occurred both before and after the epidemic fever period. The question is whether at the period of the epidemic such bunds were constructed in all the affected district just before the outbreak to such an extent as to have been the cause of each outbreak.

Let us see what was the opinion of the Sanitary Commissioner of Bengal, who himself spent long periods during two years in touring through the affected districts, and whose long report on the subject is a mine of carefully recorded facts as observed by himself. Dr. Jackson writes: "I regard the supposition that a line of railway embankment could, under any circumstances, originate a travelling epidemic like that in Burdwan as ridiculous and unworthy of serious consideration." And again: "I have invariably found that even when the road did cross the drainage line, the villages on either side were equally bad; and lastly, I have

found the fever just as virulent in places where no road existed, in both wet and dry localities." In one instance this theory was carried to such an extreme that the outbreak of fever in a certain place was actually attributed to the obstruction of the drainage by a road which had been estimated for, but never constructed. Dr. Jackson also found the fever in dry parts with a water level far below the surface of the ground (20 feet), and indeed he states that the fever is often more virulent, but of shorter duration in such places. It is evident, then, that no physical cause has been proved to exist throughout the large area covered by this epidemic fever, which can account for its incidence, by having caused a waterlogging of the soil, advancing coincidentally with the progress of the fever, and ceasing as it died out.

The remaining theory is that the fever spread by means of direct or indirect infection, only limited by lines of communication, and an alluvial soil. Evidence in support of this view may be of two kinds, which will be separately considered:—

(1) The distribution and spread of the disease may be such that it can only be explained on the ground that the disease is carried from place to place by human intercourse.

(2) Specific instances where there is strong evidence of the disease having been infectious.

There is abundant evidence of the first class, the only difficulty being in the selection of quotations from the reports of the various medical men who have written on the subject. Thus Dr. French, after recording his opinion that the disease was an intense form of malarial fever, which local conditions were insufficient to account for, writes: "There is one thing certain about the fever, it progresses steadily, although slowly; in some years it has come east and south-east, regularly west and north-west; it has followed like a rolling wave the chief roads and lines of communication; and it is steadily going on to the west and north-west." The Civil Surgeon of Serampore writes:—"There is no doubt that the fever seems to follow the tracts of the main and branch roads of the district originating at Jehanabad, on the other side of the Damuda; the disease can be distinctly traced along the old Benares road, which ends at Sulkea above Howrah. There is no doubt that the fever has been carried along this road to Howrah," and he illustrates his remarks by a map.

Dr. Barker of Birbhum, in 1872, in a remarkable report, after discussing the very insanitary state of the villages of that district, continues: "Perhaps it is another instance of that state of things which requires a new element to quicken into action. It is difficult to say whether this element was introduced into the district through air or water or through human intercourse. That some such element was imported, is but

too evident from the absence of fever in previous years when the same sanitation prevailed," and again in 1873 "I hold the opinion expressed before that the disease was not generated here but introduced from without;" and admitting that the fever is a malarious one, he writes:—"It is hard to disassociate one's mind from early scientific training but facts are stubborn things, and plainly point to the fever being communicable;" a truly scientific way of looking at the question, and one which, had our present knowledge of malarial and other specific fevers been then available, would have assuredly lead him to a correct conclusion.

It is, however, in the writings of Dr. Jackson that the most conclusive evidence on this head is to be found, and his views are all the more valuable in that they are founded on a perhaps unique experience of the fever in various districts. He traces the disease year by year, and shows how true areas, one low and moist, and the other somewhat higher and drier than the average, but both similar in the respect that they were cut off from active communication with the infected districts around them by physical conditions such as jheels, rivers, or absence of roads, entirely escaped the disease. He records an instance in which numbers of the people of certain unaffected villages "preferred losing their law suits to incurring the risk of visiting Jehanabad," an affected place. After discussing the spread of the fever from Nadia into Burdwan he writes: "From a consideration of the above facts, I conclude that the fever was imported into Burdwan, and that if there had been no connection and communication between the people of the thannahs Culna and Poorbusthali and the fever-stricken villages of Nadia, there would have been no fever," and he sums up "wherever there has been active intercourse, the fever had travelled; where there has been little or none, it has died out. . . . It will be seen from the foregoing remarks that while I believe the fever to be malarious in its origin, and to have some malarious characteristics, I believe it to be not a mere or simple, but a contagious malarious fever; that is probably typho-malarial, and that it has not been produced in Burdwan, but imported, and again carried from Burdwan into Birbhum, and its behaviour under the various conditions observed are quite incompatible with it being simply malarious locally produced or non-contagious." As the above was written in 1873 doubtless Dr. Jackson uses the term "typho-malarious" in its old sense of malignant malarial fever, and this is in agreement with every other writer on the subject, with whom I am acquainted in regarding the fever as essentially malarial in its nature. Thus Dr. Joubert, when Civil Surgeon of Burdwan in 1879, writes: "I am of the opinion that it was a purely malarious fever locally intensified into a very virulent type. . . . All those who have had opportunities of studying

the disease thoroughly hold the same opinion that it was purely a malarial fever."

Coming now to the question whether any instances are on record of the fever being infectious, it may first be pointed out that the disease usually began in an insidious manner in any place, and that "the year of invasion is never the year of intensity. The fever is generally present for a year without attracting attention" (Dr. Jackson). Nor is this surprising when we consider that the fever is a malarial one, introduced into notoriously malarial districts, and only differing from the ordinary malarial fever by its greater intensity and fatality, and in its being carried by human intercourse along lines of communication. When we remember the great difficulty of tracing the exact mode of spread, and even the manner of introduction, into a country previously free from them of such well marked diseases, influenza and plague, which are generally recognised as communicable or infectious diseases, how much more difficult will it be to trace the exact introduction of the Lower Bengal epidemic malarial fever into villages in which malaria is endemic. It must also be borne in mind that at the time of which I am writing (as is also the case to a very large extent at the present date) the very fact that a fever was thought to be malarial was held to exclude the possibility of it being infectious, so that such a mode of spread of the disease would not only not be sought for, but if any apparent instances of infection taking place were met with, some other explanation of the facts would be looked for. Nevertheless, in spite of all these difficulties, numerous cases of infection are recorded by Dr. Jackson, all of which came under his personal observation. Only one or two instances need be recorded here. Thus he, in the account of his tour in the affected districts in 1873, writes: "Neema I found to be an insignificant little village of only 9 houses, containing at the time of my visit 65 people; but during the preceding year, 1872, there had been 21 deaths. The people's account of the visitation was this. In May 1872 some men belonging to the village, who had been employed in the country south of the More, where fever was prevalent, returned sick with fever to the village. The other inmates of their houses then began to suffer, and in a little time all the inhabitants were attacked. Some of them had friends at Kotasore (two miles west), and asked them to come and nurse them; but those who came were also attacked, returned with the fever on them to Kotasore, hitherto free from the disease, and it began to spread there in the same manner. This was a volunteered statement. Kotasore was also visited and the latter part of the above statement was corroborated by the inhabitants. Once more it must be borne in mind that there is a kind of intercourse between infected and uninfected

districts, which is the necessary consequence of the prevalence of fever. Sickness and death during the outbreak put so many of the labouring classes *hors de combat*, that much of the annual crop would be lost unless extraneous assistance were procured. For this purpose the neighbouring uninfected villages are resorted to; a few labourers are obtained from each of the places around, and it is a common history that the people so employed return to their own houses with the fever, and introduce it among their own people.

Enough has been written to show that while none of the theories of local origin of the epidemic in each district due to local physical changes are supported by facts which cover the whole origin and course of the epidemic, yet, on the other hand, there is ample evidence that the disease was spread by means of human intercourse along lines of communication, and instances of undoubted infection are not wanting. In fact, it was nothing but the dogmatic opinion that malarial fever could under no circumstances become communicable which prevented this explanation of the steady spread of the disease being accepted. What was an insuperable difficulty twenty-five years ago, when the malarial organism was unknown, while the science of bacteriology was in its infancy, is at the present time easily explicable in the light of modern researches. I will first state my view of the epidemic as a whole and then briefly give the arguments in favour of it, derived from recent advances in our knowledge.

I hold that the Lower Bengal malarial fever epidemic arose in Jessore by an intensification of the ordinary fever of that very malarious district during the first half of this century by means of extraordinary physical causes (in this case either from silting up of the river Bhayrub or from this cause combined with abnormal variations in the rainfall in certain years), until it attained to the power of infection, and that it spread slowly from Jessore through the other affected districts as a wave of increased mortality due to this intense communicable type of malarial fever, as long as it found a suitable (alluvial) soil for its propagation, and lines of communication along which it could be spread by means of human intercourse. If the names and dates only be altered this will be found to be precisely the conclusion that I have come to regarding the nature of the Assam epidemic of malarial fever ("Kala-azar"), only in the latter case I have been able to furnish much more conclusive evidence of the infectiousness of the disease and also concerning its exact origin. The arguments in favour of this view, which are given in the 9th section of my report on "Kala-azar" equally apply to the Lower Bengal or "Burdwan fever" epidemic, so they will only be very briefly indicated here.

That the prevalence and intensity of malarial fevers vary greatly from year to year in the

same districts in accordance with seasonal causes, usually excess or deficiency of the rainfall, is well-known. If two unhealthy years succeed each other something approaching to local epidemic of malarial fever may occur. Is it then surprising that three or more successive unseasonal years, such as could only very seldom occur may produce a spreading epidemic, or that the succession of five out of six years of greatly deficient rainfall in the early seventies should have started the Rangpur-Assam epidemic which is still actively spreading up the Brahmaputra valley, or that a rapid silting up of the main river of such a district as Jessore might originate a similar epidemic? Such epidemics have doubtless occasionally occurred for centuries past. The difficulty of proving by direct evidence the introduction and spread of an intensified and infectious form of malarial fever into a notoriously malarious district by human intercourse is necessarily well nigh insuperable, but that a malarial fever may be introduced into an island previously free from it by means of human intercourse and may there spread in the form of an epidemic is proved by the case of Mauritius and Réunion. Up to 1865 malarial fever was unknown in these islands, and is still unknown in the neighbouring island of Rodrigues. At the date mentioned it was introduced by coolies from India, and such a fearful epidemic ensued, that one-third of the inhabitants of the islands are said to have died in the course of four years, while in 1867 alone there were 31,920 deaths out of a population in the area affected not exceeding 130,000. Moreover, the disease remains there to the present day but in a milder form. It is worthy of note that this epidemic took place at the very time that the "contagious malarial fever" was raging in Burdwan, and although I have not yet been able to ascertain whether any of the Indian coolies, who are said to have carried the disease to Mauritius, actually came from the infected areas in Bengal, yet I venture to suggest that this was very likely the origin of the Mauritius outbreak. This proposition is to some extent supported by the following opinion recorded by Dr. French when writing in 1871 of the Burdwan epidemic, "it appears to me to be identical with the epidemic fever of the Mauritius of 1866-67."

It must be carefully noted that I do not say that all malarial fevers are infectious, but only that, under extraordinary circumstances, malarial fevers may be intensified until they become so, and may then be spread by human intercourse to places situated on a suitable soil. This explains all the facts of both the Lower Bengal and Rangpur-Assam outbreaks. Unfortunately it is incapable of scientific demonstration as long as we are unable even to cultivate the malarial organism, but it derives much support from recent bacteriological work on other germ diseases. Leaving on one side all the instances

in which the germs of disease have been artificially intensified, let us take the case of pneumonia, which ordinarily is not an infectious disease, yet every now and then it becomes so, and attacks whole families, or large numbers of a regiment, as occasionally happens on the North-West Frontier of India, where instances have occurred of sick attendants over other cases being struck down by the disease, which has in sometimes only been eradicated when the troops were placed under canvas. The relation of Pestis minor to true plague appears to be a similar instance.

In the same way I maintain that in the case of travelling epidemics of malarial fever, the germs of the disease have become intensified, as it were in Nature's laboratory, by conditions unusually favourable to their vitality, until they attain to the power of being communicated from one person to another either directly through the air, or indirectly after passage through the soil. I shall not attempt to give here my views as to the exact way in which the infection takes place, as I hope to do so in another place, and this paper has already exceeded the limits I had intended.

The hope of being able to throw any light on the vastly important subject of the Lower Bengal malarial fever epidemic must be my excuse for raking up such a much discussed, but now partly forgotten, subject.

DR. ROGERS' REPORT ON KALÁ-ÁZÁR.

THE following is an abstract of remarks by Surgeon-Colonel A. Stephen, M.B., Principal Medical Officer and Sanitary Commissioner, Assam, in a letter forwarding the above report to the Secretary to the Chief Commissioner of Assam:—

Leaving Calcutta on the 16th of April 1896, Dr. Rogers visited Dhubri, Ganhati, Shillong and Tezpur, in order to learn the views of the Civil Surgeons of those places on the disease which he was about to investigate, and in due course arrived at Nowgong, the capital of the district in which the disease was at that time most prevalent, and which he was requested to consider as, for the time being, his head-quarters. He spent the next five months in the Nowgong District in investigating the disease. During these months he studied the cases of the disease which he met in the Nowgong dispensary and jail, and in a large number of infected places in that district, including a considerable number of tea-gardens. In October he proceeded to Shillong in order to study the minute pathology of the organs of persons who had died of *kalá-ázár* in the Nowgong District, and on whom he had performed *post-mortem* examinations. He afterwards visited Sylhet to study cases of ordinary chronic malarial fever there, and to notice the differences, if any, between them

and *kala-azar*. After leaving Sylhet, he paid a short visit to the Garo Hills, and then made tours in the Nowgong district, in the Mangaldai and Tezpur subdivisions of the Darrang District, and in the Golaghat subdivision of the Sibsagar district, and in March 1897 he proceeded to Shillong to complete his report.

In the first section of his report, Dr. Rogers gives a short history of *kala-azar*. The disease was first described in the Assam Sanitary Report for 1882, in an appendix to which it is stated that the attention of administrative officers became directed to it in the Garo Hills as far back as 1869. The disease gradually spread up the Brahmaputra river, especially on its south bank, and, when Dr. Rogers commenced his investigations, it had reached the eastern portion of the Nowgong district, and was beginning to make its appearance in the Bishnath portion of the Darrang district. Dr. Rogers points out that for several years after the disease was first described in 1882, medical officers were of opinion that *kala-azar* was of malarial origin, and that it was not contagious. In 1889 Dr. Giles was appointed to enquire into, and report on, the cause or causes of *kala-azar* and *beri-beri* of Ceylon, and in October 1890 he published his report. In this report he gave it as his opinion that the increased mortality in the districts invaded by so-called *kala-azar* was due to *anchylostomiasis*. It was afterwards ascertained, especially through the investigations of Dr. Dobson, that *anchylostomata* were found in the majority of healthy people in Assam, and that the worm was present in persons not suffering from *kala-azar* in as great numbers as in those affected with that disease. At the time when Dr. Rogers was appointed to enquire into the nature of *kala-azar*, the majority of medical officers were of opinion that the disease in most respects resembled chronic malarial fever, but, as there seemed to be evidence that it was contagious, they considered that there might be some other factor in it besides malaria. All medical officers, with one exception, believed that the disease was quite distinct from *anchylostomiasis*.

In the third section of his report Dr. Rogers gives a clinical description of *kala-azar*. He defines it as a chronic and relapsing form of fever of an intermittent or irregularly remittent type, very resistant to treatment, producing progressive anæmia, great wasting, and, in many cases, dropsy, and terminating either in a final attack of fever or in asthenia, often accompanied by diarrhoea or lung complications. He states that the disease usually attacks several members of a household, and spreads slowly in a wave of increased fever mortality, and dies out in about six years from its commencement. He is of opinion that the disease may last from two months to three years, and that its usual duration is from four to nine months. From what

he saw on tea-gardens, he came to the conclusion that the number of cases begins to increase in April, that the disease is most prevalent during May, June and July, and that the months of minimum prevalence are December, January and February. He states that this seasonal incidence agrees closely with that of ordinary malarial fevers, except that it is more extended. He found that the disease attacked persons of all ages, but that children were, on the whole, more liable to be attacked than those of a more mature age. Both sexes suffer equally from the disease, and all classes are attacked by it, though, in his opinion, the mortality is greater among the poorer classes. He had reason to believe that opium-eaters did not suffer so much from the disease as those who were not addicted to that habit.

He found that the principal symptoms of the disease were the following:—

(a) *Fever* is the most constant feature of the disease, and is of an intermittent or irregularly remittent type. The fever usually relapses several times during the course of the illness, and a marked characteristic of it is that, after two or three attacks, the patient is often not aware that he is suffering from fever, though his temperature may be as high as 103°.

(b) The *spleen* is enlarged in every well-defined case of *kala-azar*, and in most cases it is very much enlarged.

(c) The *liver* was found to be enlarged in 93 per cent. of 70 cases examined, and in about one-quarter of the cases the enlargement was very great.

(d) *Anæmia*, as shown by the pallor of the conjunctiva, was present in 93 per cent. of the cases examined, and was markedly present in 62 per cent. of the cases.

(e) *Dropsy* was met with in about one-third of the cases. In some cases there was slight œdema of the feet, and in others there was marked swelling of the lower extremities. Œdema of the face was found to be very rare. This is a marked contrast to the œdema of *anchylostomiasis*, which is most frequently seen in the eyelids and cheeks.

(f) The *heart* was found to be smaller than normal, chiefly due to the general wasting of the body. Cardiac and venous murmurs were very rare. In *anchylostomiasis* hæmic murmurs are frequent.

(g) Changes in the *nervous system* are very slight.

(h) *Pneumonia* and *diarrhoea* are frequently met with in the later stages of the disease, and often play an important part in bringing about a fatal result.

These symptoms are very similar to those of chronic malarial fever, and, in order to observe cases of chronic malaria in a place in which *kala-azar* was not known to exist, Dr. Rogers visited Sylhet, and the Civil Surgeon of that station,

after several days' search, was able to collect six well-marked cases of that disease. Dr. Rogers found that the symptoms were almost identical with those of *kalá-ázár*, but he found that in Sylhet chronic malarial fever required as many years to develop the extreme form of malarial cachexia as *kalá-ázár* produced in as many months.

Dr. Rogers found that the mortality from *kalá-ázár* was very great. He was of opinion that in villages in Nowgong and Mangaldai the death-rate was over 90 per cent. and in a severe outbreak in a garden in the Nowgong district he found that 96 per cent. of those attacked died. This is a marked contrast to the mortality from *anchylostomiasis*, in which disease the death-rate is stated not to exceed 8 per cent.

In pages 57—76 of the report he gives the notes of 12 cases of *kalá-ázár*. These notes give a clear idea of the symptoms of the disease as observed by him. Opposite page 57 there is a photograph of ten persons who were suffering from *kalá-ázár* in the Nowgong dispensary, in August, 1896. This photograph shows in a very graphic manner the general appearance of advanced cases of *kalá-ázár*.

In section IV Dr. Rogers compares the blood changes found in *kalá-ázár* with those observed in *anchylostomiasis*. As he was under the impression that the blood of healthy natives of Assam differed from the European standard, he first made experiments in order to find the standard of ordinary natives of the country. By a series of experiments he found that the average composition of the blood in healthy natives and in cases of *kalá-ázár*, chronic malaria, and *anchylostomiasis* was as under:—

kalá-ázár. On the other hand, the blood in *anchylostomiasis* contained twice as many white corpuscles in a cubic millimetre as *kalá-ázár* blood did. Hence Dr. Rogers formed the opinion that, by examining the blood, a diagnosis can be at once obtained between cases of *kalá-ázár* and *anchylostomiasis*. He observes that in *anchylostomiasis* blood is sucked by worms, and all the elements of the blood are equally lost. In *kalá-ázár*, on the other hand, red corpuscles are destroyed by the plasmodia, but the other elements of the blood are not directly affected, and the colouring matter of the red corpuscles is converted into pigment, which is deposited in the spleen, liver and other organs.

In section V Dr. Rogers discusses the pathology and nature of *kalá-ázár*. In the beginning of the section he states that he was not able to devote as much time to the microscopic part of the work as he should have liked to do. It is unfortunate that he was not able to devote more time to this portion of his work, especially the bacteriological portion of it. The microscopic pathology of *kalá-ázár* was already well-known, and a principal reason why the services of an expert were asked for was that, from the microscopic examination of the blood and organs of the body, and more especially from a bacteriological examination, the nature of *kalá-ázár* might be once for all determined. Had Dr. Rogers, in addition to what he did find out after careful examination, determined that there was no specific bacterium in *kalá-ázár* which could produce the disease, he at the same time stating the methods which he resorted to with a view to determining the presence of such bacterium, with diagrams showing the principal

	Amount of hæmoglobin.	Number of red corpuscles in a cubic millimetre.	Hæmoglobin value.	Number of white corpuscles.	Proportion of white to red.	Specific gravity.
1	2	3	4	5	6	7
Healthy natives ...	62 per cent.	4,734,000	65	7,325	1 to 681	1.054
<i>Kalá-ázár</i> ...	33.45 "	2,462,000	65	2,600	1 " 1,170	1.048
Chronic malaria ...	31.6 "	2,000,000	73	1,600	1 " 1,400	1.042
<i>Anchylostomiasis</i> ...	15.16 "	1,145,000	31	5,338	1 " 524	1.034

The averages for chronic malaria were obtained from five cases, too small a number to be of much value. As far as they go, the experiments show that blood in chronic malaria was, on the whole, very similar to that in *kalá-ázár*, except that in chronic malaria the number of white corpuscles was very much less, and the specific gravity of the blood was considerably lower than in *kalá-ázár*. The character of the blood in *anchylostomiasis* and in *kalá-ázár* was, however, found to be very different. The blood in *anchylostomiasis* was found to contain about half as much hæmoglobin and half as many red corpuscles in a cubic millimetre as *kalá-ázár* blood did, and the hæmoglobin value was only half that in

micro-organisms detected, and had he demonstrated that the only plasmodium found in the blood in *kalá-ázár* was identical with the plasmodium malarie, which is usually believed to be the specific cause of malarial fever, diagrams of the plasmodium detected being also given, he would have succeeded in absolutely demonstrating that *kalá-ázár* was nothing more than a modified form of malarial fever. On making a microscopic examination of sections of the liver, spleen and kidneys, he found deposits of pigment distributed in a similar manner to that figured by Kelseh and Keiner in cases of chronic malaria examined in Algeria. He sent portions of the liver of five cases to Calcutta for deter-

mination of the amount of iron contained in them. Unfortunately, the *anchylostomiasis* case was complicated with malarial fever, and three of the four *kalá-ázár* cases were complicated with *anchylostomiasis*. The results obtained were thus of little value, and the liver in the *anchylostomiasis* case was found to contain more iron than the liver of the three *kalá-ázár* cases complicated with *anchylostomiasis*.

He states that he detected the plasmodium malarie in nearly all the more advanced typical cases of *kalá-ázár* during the presence of the fever, and that the forms found included most of those figured by Italian authors as typical of quotidian fever, but he does not give diagrams of the forms determined. In the notes of the cases of *kalá-ázár* given in pages 57 to 76, he states that the micro-organism was observed in five of the twelve cases.

In the second portion of section V Dr. Rogers states that the facts given prove incontestably that, whatever *kalá-ázár* may be, it is not *anchylostomiasis* and that *anchylostomiasis* is not an essential factor in its production, and I quite agree with him in that opinion. He goes on to say that the facts given in the clinical and pathological portions of his report prove that *kalá-ázár* is nothing more than a very intense form of malarial fever. As the bacteriological portion of his investigation was incomplete, he, in my opinion, fails to prove that there is not something in addition in the disease, causing its characteristic spread and excessive mortality, which he has failed to discover.

In the first portion of section VI, he gives an account of the ravages caused by the disease in the Goalpara, Kamrup and Nowgong districts, partly from the decrease in the population in affected tracts in 1891, as compared with the population when the census was taken in 1881, and partly by the decrease in the amount of land under cultivation. He also discusses the monthly mortality of the disease, which is illustrated by a chart. He remarks that the seasonal distribution was the same as in ordinary malarial fevers, except that it was a more extended one. I found that there was considerable difference in the monthly distribution of the diseases in 1896, as determined by the registered mortality in places in which *kalá-ázár* was prevalent in that year. From the statistics it appeared that *kalá-ázár* was most prevalent in May, June, and April; and that February and January were the months of minimum prevalence. Only 10·07 per cent. of the deaths occurred in May, the month of maximum prevalence, and as many as 7·33 per cent. of the deaths occurred in February, in which month fewest deaths were registered. The months of maximum mortality from fevers, other than *kalá-ázár*, were June, May, and July, and fewest deaths were registered in April, September, and October; 12·44 per cent. of the deaths occurred

in June, in which the largest number of deaths were registered, and 7·17 per cent. in each of the months of April, September, and October, the months of minimum prevalence. He notes that in the Nowgong district *kalá-ázár* was not most prevalent in *terai* lands, but in the villages on both sides of the Kullung river, and he also notes that the sanitary condition of that district, including drainage and water-supply, was certainly not worse now than it was before *kalá-ázár* made its appearance.

In the second portion of section VI, Dr. Rogers has very clearly indicated the distribution of the disease, especially in the Nowgong and Darrang districts, noting that the disease has generally travelled along the principal lines of traffic. There are, however, exceptions to this rule, as may be seen in the case of Silghat and the villages beside it. Silghat is situated on the bank of the Brahmaputra, is 32 miles from Nowgong, and is in daily communication with it, and yet the disease is only beginning to appear in Silghat, though it was prevalent in the town of Nowgong in 1891. I agree with the summary of the broad facts relating to the spread of the disease given in pages 145 and 146, except that the seasonal distribution of malarial fevers and *kalá-ázár* in 1896 was not the same. In that year, the mortality from *kalá-ázár* was comparatively high in the months of minimum mortality from malarial fevers.

The communicability of *kalá-ázár* is discussed in section VII. The facts given in this section are very interesting, and Dr. Rogers walked hundreds of miles, in a very difficult country, in places in which the disease had recently broken out, in order to find out the circumstances under which the disease had appeared in individual villages. The facts ascertained by him tended to prove what was already held by many medical officers who had considerable experience of the disease, that *kalá-ázár* appears to be frequently conveyed from one village to another by human intercourse. That communication is frequently not readily effected is shown by portions of villages remaining unaffected for months after other portions of them have been severely affected, when all intercourse between the affected and non-affected portions of villages could not have been prevented. Silghat, on the bank of the Brahmaputra, is at present only slightly affected, though Nowgong and Puranigudam, with which it is in daily direct intercourse, were severely affected in 1891.

In the beginning of section VIII, on the origin of *kalá-ázár*, Dr. Rogers states that he is of opinion that *kalá-ázár* could not have appeared in epidemic form in the Garo Hills before 1875, as up to that year the revenue had always been collected in full. He, however, states that the greater part of the country was not taken over till 1871-72, so that the revenue registers could

give little information regarding the state of matters, in the district, as a whole, previous to 1871. That the disease had committed great ravages in portions of the Garo Hills previous to 1875 is shown from what the Sanitary Commissioner states in an appendix to the Sanitary Report for 1882, that as far back as 1869 the attention of administrative officers had been directed to *kalá-ázár*, which had decimated, and, in some instances, almost depopulated, numerous villages in the district. Dr. Rogers gives no proof that the outbreak which was prevalent in 1875 was different to what was observed in 1869. Further on, in this section Dr. Rogers attempts to prove that the outbreak of *kalá-ázár* in the Garo Hills, which appears, from information given by Colonel Maxwell as quoted in page 169 of the report, to have been very fatal in one portion of the Garo Hills soon after 1872, if not in that year, and to have been so prevalent in 1875 as to cause a deficiency of revenue in that year, was produced by malarial fever spreading by contagion from Rangpur to the Garo Hills district. Malarial fevers were very prevalent in Rangpur during the years 1872-77. From the extracts from the sanitary reports of this district, it appears that in 1873 and 1874 the fever in that district was of the character usually seen in severe outbreaks of malarial fever, the majority of the population (in 1874, 80 per cent. of them) having been prostrated by the disease. This is very different to the incident of *kalá-ázár* as seen in Nowgong and Mangaldai, where the inhabitants of many villages remained in a normal state of health long after the disease was very prevalent in neighbouring villages. In 1875, the fever mortality in Rangpur was about the same as it was in 1874, but the remittent type of the disease seems to have been more prevalent than it was in the previous year. The fever mortality in that district was very high in 1876 and 1877, and began to fall in 1878. No one seems to have questioned that this prolonged excessive mortality in Rangpur was due to ordinary malarial fever of a severe type, and was ascribed to scantiness of rain and excessive heat, which intensified and concentrated the marsh poison. As the mortality from *kalá-ázár* in the Garo Hills was sufficiently great to produce a reduction of revenue in 1875, the disease was probably prevalent in 1874, and, from what Colonel Maxwell says, was possibly very fatal in certain places in 1872. I cannot, therefore, see how this outbreak of a type of fever, the symptoms of which are so characteristic that, when several cases occur in a village, the ordinary native at once recognises them as *kalá-ázár* and as quite different to ordinary malarial fever, could have been caused by persons crossing the Brahmaputra from Rangpur to the Garo Hills, suffering from a fever which, up to 1874 at any rate, was ordinary malarial fever, and which appears

never to have been considered by medical officers in Bengal to have differed in any respect from severe outbreaks of ordinary malarial fever.

In pages 182 to 192 of the report, Dr. Rogers gives the resemblances between Burdwan fever and *kalá-ázár*. The distribution of the two diseases seems to have been in many respects similar, but the character of Burdwan fever appears to have been very different from that of *kalá-ázár*. Many cases of Burdwan fever suffered from severe head symptoms, which are not seen in *kalá-ázár*, and death in those cases often occurred after an illness of from three to ten days. *Kalá-ázár* is essentially a chronic disease, and death rarely occurs under a period of two months.

In section IX, while discussing the communicability of malarial fever, Dr. Rogers quotes as an analogous case the outbreak of fever in the Mauritius in 1865. It is certainly the case that a very severe outbreak of what was generally believed to be malarial fever occurred in Mauritius in that year, and that some people were of opinion that the disease was introduced by coolies from India.

In order to show that there is nothing inherently improbable in the view that the poison of malarial fever may become so intensified as to become communicable, he brings forward the fact that pathogenic bacteria can be artificially intensified, and he notes that some persons are of opinion that pneumonia, and perhaps the plague, may have two types, a contagious and non-contagious one. These diseases are believed to depend on the presence of vegetable micro-organisms, and, therefore, it is scarcely logical to draw any analogy between them and malarial fever, which is supposed to be caused by an animal micro-organism.

In section X Dr. Rogers makes certain recommendations, which, if carried out, he believes, would put a stop to *kalá-ázár* in affected places, and would prevent the disease spreading to places in which it has not appeared up to date. The recommendations are the following:—

(a) In affected tracts of country, he recommends that the people of affected villages should be encouraged to remove their houses from affected to new sites, which need not be more than 200 yards from the old ones, during the cold weather months when the disease is at a minimum. To encourage them to do this, he recommends that they should be obliged to pay rent for only one site for the year during which the change is made. As the sites of villages, which have been in existence for some time, are usually in a very insanitary condition, this recommendation might, when practicable, be carried out. Too much should not, however, be expected from the change, as Dr. Rogers has shown that *kalá-ázár* frequently breaks out in previously-unaffected villages when single cases of *kalá-ázár* take up their residence in them, and the

inhabitants of affected villages, when they make the change, must take their sick along with them. Though the mortality from *kalá-ázár* is at a minimum during the cold-weather months, the death-rate even then is very little below the average of the year. In 1896, 23·21 per cent. of the *kalá-ázár* deaths occurred during the months of December, January and February.

(b) He recommends that means should be taken to prevent the entry into tracts, not affected with the disease, of persons suffering from the *kalá-ázár*, and with a view to giving effect to this proposal, he suggests that the provision of the lately-passed Epidemic Diseases Act, which renders this action possible, should be put in force. It is certainly the case that *kalá-ázár* has usually been checked when it reaches a broad belt of uninhabited country, and there have been many examples of outbreaks of the disease in villages soon after the arrival in them of persons suffering from *kalá-ázár*, but as, in order to be effectual, the provision would have to be in force for a considerable time, and as even medical men can with difficulty recognise single cases of the disease, I am very doubtful whether the provision of the Epidemic Diseases Act referred to should be put in force for this purpose. The inhabitants of non-affected villages might, however, be encouraged to prevent people, believed to be suffering from the disease, visiting their villages.

(c) Appendix II attached to this report is a note on the spread of *kalá-ázár* and how it may be checked. Dr. Rogers recommends that this note should be translated into the languages of the inhabitants of the Upper Assam Valley, and distributed gratis to the heads of villages in both the affected and threatened tracts of country. I strongly recommend that this suggestion be given effect to.

Dr. Stephen then expresses his concurrence with the prophylactic measures suggested by Dr. Rogers to prevent outbreaks among coolies working on tea plantations, and concludes by alluding to the energy and zeal which Dr. Rogers had evidenced in the course of his observations. He adds that he considers Dr. Rogers has proved that: (1) the disease is distinct from anchylostomiasis, thus confirming the long-held and almost universal opinion of other medical officers in Assam; and that he has (2) shown the close alliance between malarial fevers and *kalá-ázár*; but that he has failed to prove its identity with malarial fever, and that the disease was carried by human intercourse from Rangpur to Assam, or that it arose from an intensification of the ordinary malarial fever of that district.

SOME REMARKS ON THE POSITION OF CERTAIN REMITTENT FEVERS HITHERTO FREQUENTLY CLASSED AS MALARIAL, WITH ILLUSTRATIVE CASES AND TEMPERATURE CHARTS.

BY SURGN.-MAJ. J. H. TULL-WALSH, I.M.S.

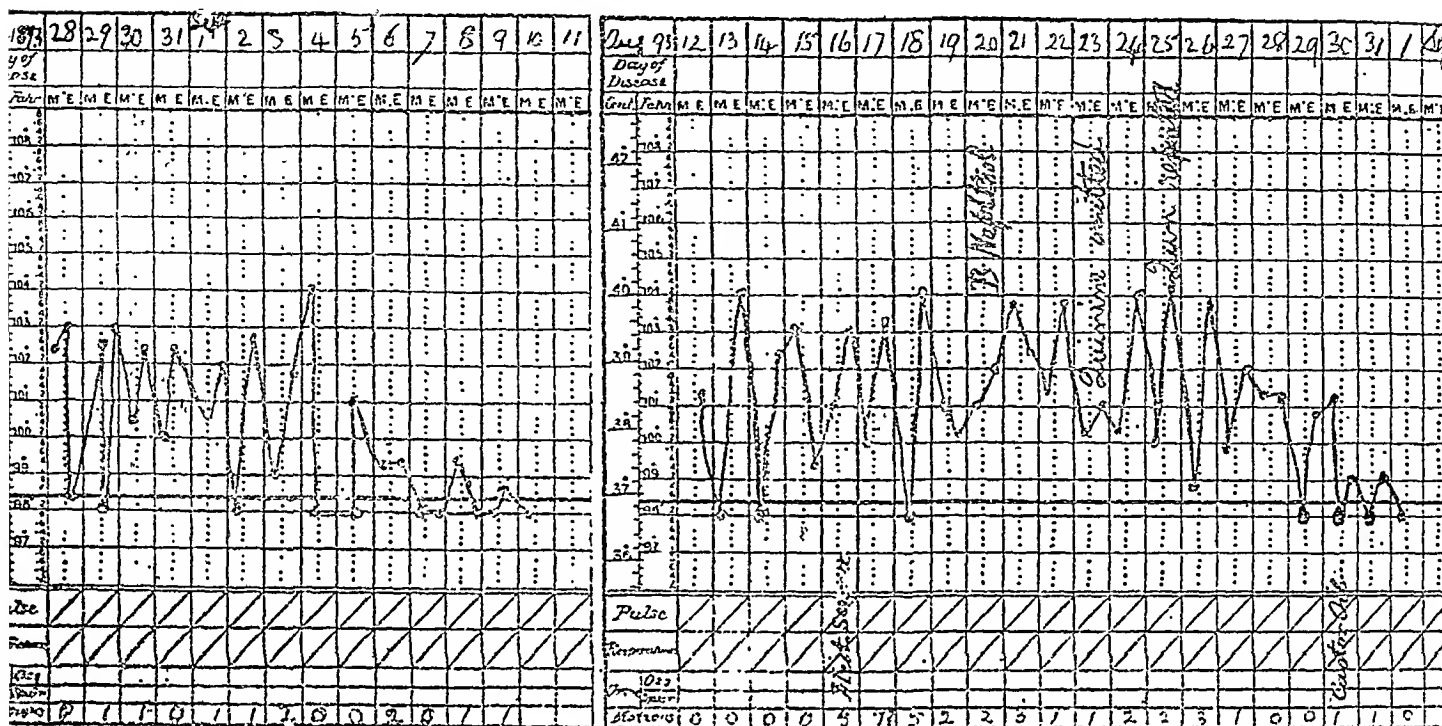
ALL authors admit that the *remittent fevers* vary very much in type, and years ago Norman Chevers wrote concerning them as follows:—“*Remittent fever* is not in my opinion modified or aggravated *intermittent fever*.” So far as many of the cases are concerned I quite agree with this opinion, as do a great number of medical men in this country. *Remittent fevers* classed under *malaria* seem to fall into two main groups.

- (a) Ordinary *remittent fevers* presenting in the blood ‘crescents’ or other forms of the *plasmodium malarie*. The attacks are not very severe, lasting generally a week, or at most 15 to 35 days. Cases I and II and charts taken from my note-book are given as examples for comparison.
- (b) Severe or ‘pernicious’ *remittent fever*.—A serious form of fever with many symptoms resembling those of *typhoid fever*, and lasting from 30 to 70 days or more—Case III and chart. There are strong reasons for thinking that many of the ‘fevers’ classed by custom under this ‘heading’ should be removed entirely from the catalogue of *malarial diseases*.

There is further a diagnostic test in the way many *remittents* react to quinine, and Osler believes that where we find no benefit from quinine we are not dealing with *malaria*. Many of these cases present no signs of the *plasmodium malarie* in the blood. They do, however, present certain features which would lead one to regard them as in some way clinically allied to the *typhoid fever* class. Up to within the last few years all *remittents* occurring in malarial areas (not markedly *typhoid* or owning other accepted origin) have been included under the ‘heading’ *Malaria*. It is, I admit, often very hard to distinguish many of these anomalous cases from ordinary *malarial remittents*, and perhaps this difficulty has given rise to the term “*typho-malaria*” as used by some writers. It only requires a little thought to convince us that, having accepted the *plasmodium malarie* as the active cause of true *malaria*, we cannot possibly have a disease, which, from an etiological standpoint, is a ‘cross’ between *typhoid fever* and *malarial remittent fever*. The two diseases might, of course, exist together, and many prolonged *remittents* present, as we have seen, certain symptoms, hæmorrhage, etc., which occur also in *typhoid fever*. Further, men of any experience know that we meet with very curious and *atypical* cases of *typhoid fever* (Case IV and chart). A somewhat similar case

has been reported by Dr. Carslow (*Lancet*, ii, 1890). Dr. Martin, of Louisiana, speaks of certain curious long-continued fevers not resembling those mentioned in text-books of

fever and in the case of certain remittent fevers occurring in Massowa. Surgeon-Captain Hughes, M.S., studied *Malta fever* for two and-a-half years, working in the military laboratory, and observ-



CASE I.

Remittent Fever—Malarial ordinary.

I. R., Eurasian, aged 12. Ill three days previous to admission; admitted into the P. G. H., Calcutta, on the 26th August, 1893.

CASE II.

W. W., European sailor, aged 26.

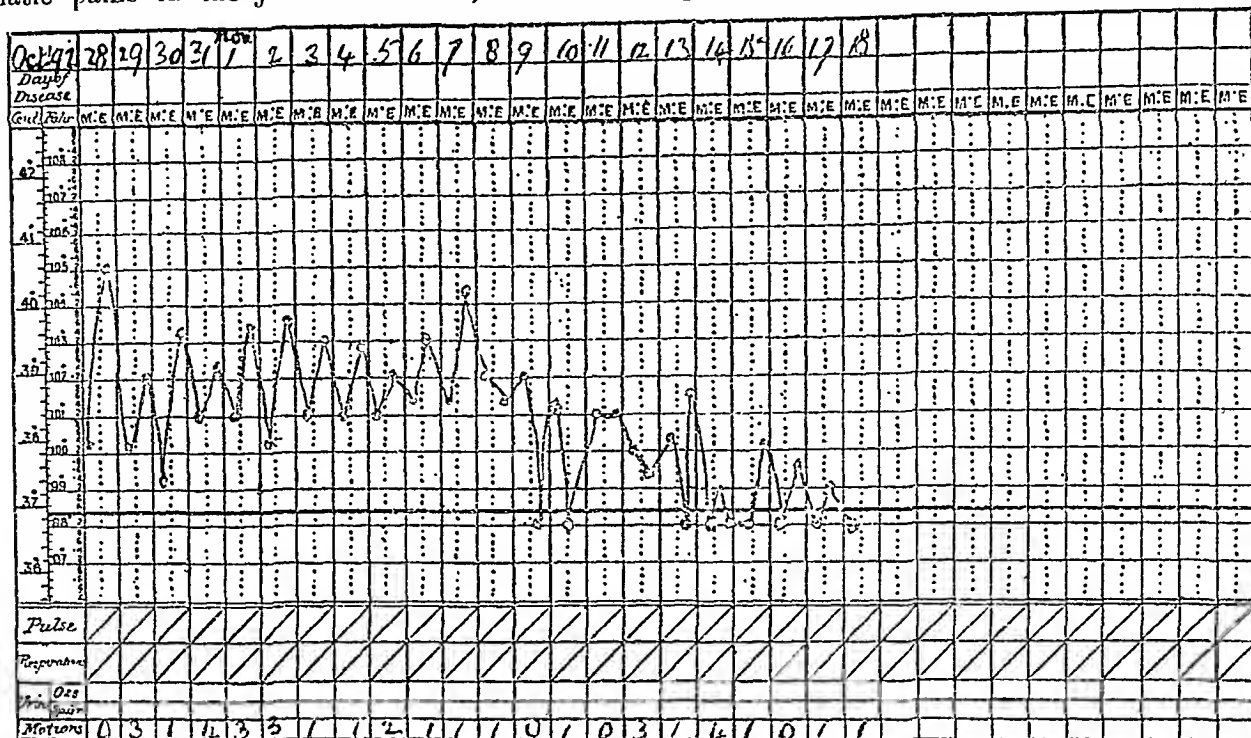
medicine; slow, remittent fevers resisting quinine. He points out that the word 'malaria' often covers a want of proper diagnosis, and alludes to the dangers which would arise if *typhoid fever* were mistaken for a *malarial remittent*. Dr. Martin thinks it possible that many of the cases of so-called "*typho-malarial fever*" are modified forms of *typhoid*, and it must ever be borne in mind that *typical typhoid fever* is much more common in temperate climates than in hot countries. Some of these Louisiana fevers differ, however, from *typhoid* and also from true *malaria*. The temperature ranges between 99°F. and 103°F., the fever lasts three to nine weeks, and the patients are not greatly exhausted by the disease. Osler and others also admit a difficulty with regard to certain *remittent fevers*. Case No. IV shows that *typhoid fever* may closely resemble these fevers, especially the kind known as *Malta fever* (cf. Case V and chart). These anomalous *remittents* should be classed apart from true *malarial fevers*, and a noteworthy effort in this direction has been made in the case of *Malta*

ing cases in the military hospital, Malta. He describes a *remittent fever* of a peculiar kind resembling somewhat, in a general way, the severe *malarial remittents*, and also, to some extent, *typhoid*. It differs from *typhoid fever* in range of temperature, duration, tendency in a few cases to periodicity, absence of lesions in Peyer's patches, less sordes and dryness of the tongue, less stupor and delirium. The *typhoid bacillus* is not found in the 'stools,' which are frequently constipated.

Malta fever differs from ordinary *malarial remittents* in the absence of *plasmodia* from the blood, in the resistance which it offers to treatment with quinine, and in the presence of certain micro-organisms in the blood and tissues. This organism is a *micrococcus*, and has been found in eight cases by Bruce, twice by Gibbs, and eleven times by Hughes. The organism is known as the *micrococcus militans*, and Bruce was able, by inoculating with a pure culture, to produce in monkeys a similar disease. Hughes repeated these experiments with like results.

Malta fever may last for six months, or even more, and is not unfrequently followed by rheumatic pains in the joints and limbs; these are

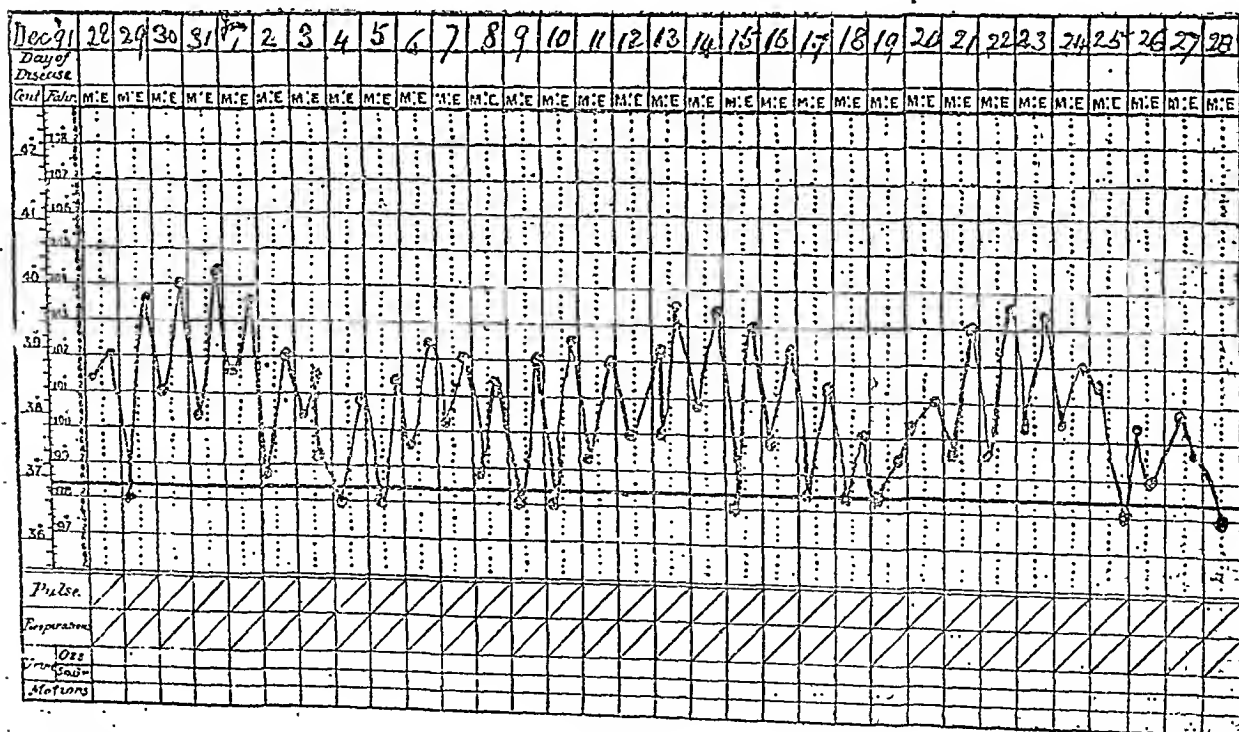
not improbably of a septic nature. Death may occur from hyperpyrexia, exhaustion, or from lung complications. The mortality among cases



CASE III.

Remittent Fever, Malarial, severe type, 68 days in hospital.

E. A., Eurasian, aged 25.



CASE IV.

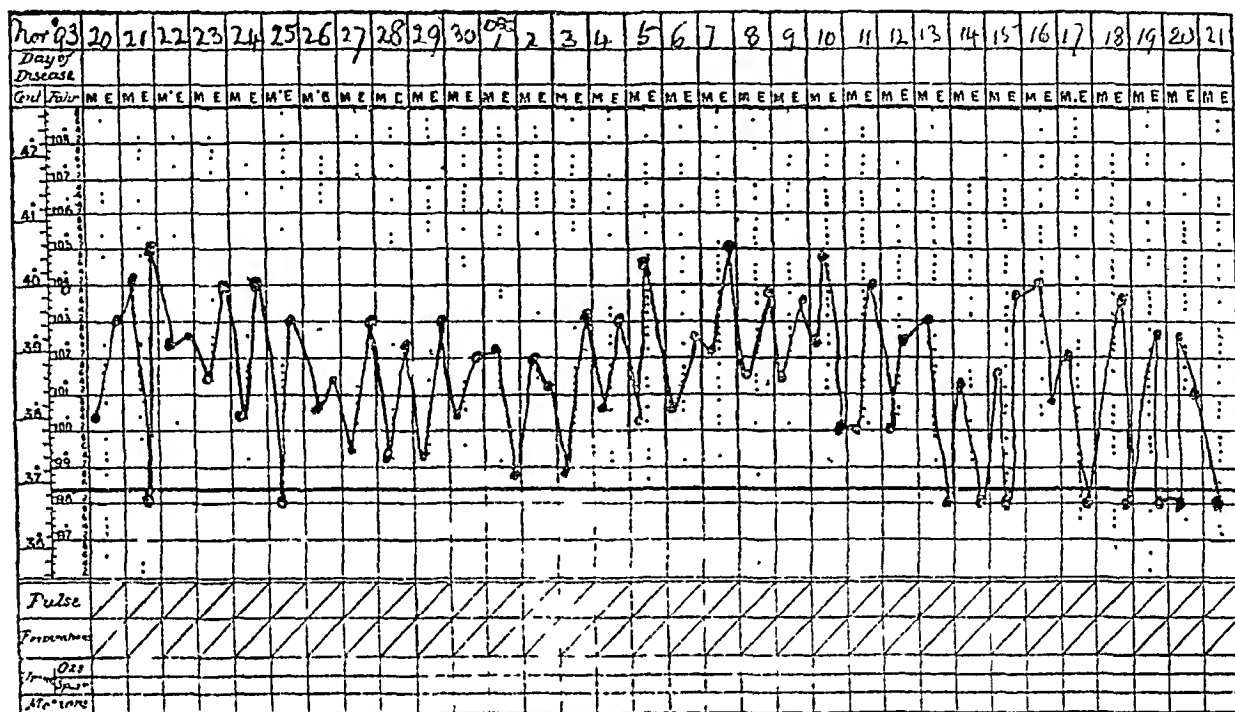
Anomalous Case of Typhoid Fever for comparison with severe cases of Remittent Fever (Malarial) and Cases of Malta fever.

N., Irish, aged 24.

treated in hospital is not, however, very high—2 per cent. according to Hughes.

The writer has had an opportunity of studying the clinical features of this disease in

One great feature which strongly divides the true *malarial fevers* from those of bacterial origin is that, while these latter are to a great extent auto-protective, the victim of an attack



CASE V.

Malta Fever.

H. R., aged 25, seaman, H. M. S. *Boadicea*.

Calcutta in the persons of sailors admitted to hospital from H. M. S. *Boadicea* (Case V and chart).

These men had been taken ill soon after leaving Malta, and while their temperature charts resemble, in the main, those given by Hughes, they also in some respects resemble those of cases of severe *malarial remittent fever* which we are accustomed to see in India. I regret that the blood, though examined for the *plasmodia* of *malaria*, was not stained and examined for *micrococci*; indeed, at the time (1891) I was not aware of the existence of the *micrococcus militensis*.

Pasquale, speaking of certain fevers occurring in Massowa, and similar, in many respects, to *malarial fevers*, says that no *ameba* could be found in the blood, nor was any satisfactory result obtained from treatment with quinine. Pasquale is certain that these were not cases of *typhoid fever*. The critical period only lasted about ten days, though the convalescence was sometimes prolonged. He found a *micrococcus*, probably similar to that found in *Malta fever*.

of *malarial fever*, either *intermittent* or *remittent*, is rendered only the more liable to subsequent attacks, which may occur even after he has left the malarious region. Many an European who has quitted India or Africa for his home in England has, when in low health, been reminded of his former troubles by a sharp attack of *ague*. The question is one of great interest to us in India, and I would suggest that those gentlemen who work at peace in the laboratories of India might assist us by making complete bacteriological examinations in doubtful cases.

CASES I AND II.

(Remittent Fever—Malaria, ordinary.)

I. I. R., Eurasian, aged 12. Ill three days previous to admission; admitted into the Presidency General Hospital, Calcutta, on the 28th August 1893. The only noticeable point about this case is the obstinate constipation. *Plasmodia* were seen in the blood, but no "crescents" or other forms. Discharged cured on the 11th

September. The fever yielded readily to purgatives with quinine and phenacetin. Normal temperatures in this and other cases of *remittent fever* are the result frequently of the administration of antipyretics. Typical charts then can seldom be obtained from persons under treatment.

II. W. W., European sailor, aged 26. Ill about three days previous to admission to hospital, and ascribed his illness to a "chill" which he felt while sleeping on deck while the ship was lying moored in the Hughli river. Admitted into the Presidency General Hospital, Calcutta, on the 12th August 1893. *Treatment*—Quinine and antipyrin with beta-naphthol while the bowels were loose. The disease began with marked constipation, and the diarrhoea was partly provoked by the purgative given (see chart). It will be noticed in this case and in Case IV that the remissions are less marked during intestinal disturbance such as diarrhoea. *Plasmodia* seen in the blood. Discharged recovered on the 2nd September. It might be better to keep some of these cases longer in hospital, but the patients will not stay, as a rule, when they feel free from fever and practically well.

CASE III.

(*Remittent Fever—Malaria, severe type.*)

Sixty-eight days in hospital.

E. A., Eurasian, aged 25, employed in the Telegraph Department. Admitted into the Presidency General Hospital, Calcutta, on the 28th October 1892. According to the patient's statement he had been ill for 23 days previous to admission. The usual febrile symptoms were present, and the patient complained of insomnia; no spots on the abdomen; tongue 'furred,' not dry; no enlargement of spleen. The bowels were not open on the day of admission, but after an enema, acted freely and continued loose for some days (see chart). On the 31st October and 1st November the stools contained some blood; this ceased on the 3rd November and did not recur. The stools were afterwards sometimes loose, sometimes constipated, always of a bright yellow colour. The case was treated with quinine, phenacetin and diaphoretics. Sulphonal and morphia were given for the insomnia, but were not required after the 5th November. On the 8th November, beta-naphthol, grs. v, was given every four hours, and relieved some enteritis which was present. The temperature became normal on the 17th November, and remained normal until the 5th December. The patient was somewhat constipated and complained of headache. The fever returned but gave way to treatment, as above, with confinement to bed. From the 30th November to the 5th December the patient was not taking any medicine. Discharged January 3rd, 1893. In the blood of this patient there were occasionally a few *plasmodia*, and once or twice "crescents" were seen;

generally nothing particular could be observed. Though a severe case there was never any delirium or dullness of the mental faculties, nor was the patient so ill as those who suffer from bacterial fevers such as typhus, typhoid, and some other anomalous remittents, of which I shall give examples.

CASE IV.

[Anomalous case of *Typhoid Fever* for comparison with severe cases of *Remittent Fever* (*Malaria*) and cases of *Malta Fever*, etc.]

F. N., Irish, aged 24, travelling actor. Admitted into the Presidency General Hospital, Calcutta, 20th November 1893; died 16th February 1894.

On admission the patient stated that he had suffered from 'fever' (probably malarial) off and on during the previous three months; bowels open regularly, and the fever accompanied with shivering each afternoon. The illness for which he was admitted had, according to his statement, lasted six days. The spleen and liver were both slightly enlarged, the spleen became smaller; no albumen in his urine on admission. He never suffered from diarrhoea; indeed, his bowels were seldom moved without an *enema* or an aperient. On the 23rd November there was a trace of albumen in the urine. Tongue at first covered with white 'fur' and red at the tip; after the first week less 'furred' and drier. No spots seen on the abdomen; slight delirium at night and insomnia; some blood in the stools on the 27th day, but on no other occasion. After several short relapses accompanied by obstinate constipation, relieved by castor oil emulsion in small and regular doses, the patient seemed to be on the way to recovery and was able to sit up by the bed-side. One day after seeing the patient in the next bed die he became faint, with shallow breathing and a weak pulse, and died apparently of shock and syncope.

Quinine had little or no effect on the progress of the disease, and though given regularly at first, it was omitted without any difference being perceptible. I regarded this case as one of "pernicious" *remittent fever*, as did two other medical men who saw the temperature chart, and noted the condition of the patient on one or two occasions. At the same time I failed to find any of the forms of the *plasmodium malariae*. The temperature always rose when the bowels were confined, or on any sudden increase in diet.

This latter point was suspicious; but, on the other hand, many cases of *malarial fever* are accompanied by severe enteritis. The age of the man was no guide in this case, as all ages suffer from *remittent fever*. The diagnosis was not borne out by the *post-mortem* examination:—

Heart—Both ventricles filled with clot; muscular tissue soft and friable; valves normal.

Lungs—Somewhat congested; no pneumonia and no tubercle.

Liver—Marked fatty degeneration.

Spleen—Apparently normal; weighed 6 ounces.

No blood or fluid in the peritoneal cavity.

On opening the small intestines, the ileum was found to contain a few small and old blood clots, and also several round, sharp-edged ulcers were seen on Peyer's patches, with floors so thin as to be torn in the washing in one or two cases. There were also numerous small ulcers at the entrance to the cæcum. There were no parasites present, and the large intestines, though slightly congested, were free from ulceration. Brain, kidneys, etc., normal.

I am of opinion that this was a case of typhoid fever, whether combined with any malarial element it is difficult to say. The case does, however, in many respects resemble reported cases of 'pernicious' remittent fever due to malaria, and also resembles cases of Malta fever.

CASE V.

(Malta Fever.)

H. R., aged 25, seaman, H. M. S. *Boadicea*. Unwell sometime previous to admission, and seriously ill for five days. Admitted into the Presidency General Hospital on the 28th December 1891. Usual febrile symptoms with high temperature and anxious expression; stools loose on admission; varied afterwards; nothing typical about them, and no blood at any time. There was never any albumen in the urine. Spleen not enlarged. No malarial *plasmodia* seen in the blood. The patient was treated with quinine, but as it seemed to have no influence on the course of the disease, it was omitted, and antipyretics and intestinal antiseptics were used. Many of the normal temperatures seen in the chart are no doubt merely the result of doses of antipyretics. This patient suffered late in the illness from severe pains in the hips, knees and back. H. R., after remaining in hospital for 105 days, was invalided to England, 11th April 1892. He recovered completely, and was one of the unfortunate victims in the loss of H. M. S. *Victoria* in 1893.

Contributors to the columns of the "Mirror of Hospital Practice" will receive twenty-five copies of their cases.

The Mirror of Hospital Practice.

ABDOMINAL SURGERY AT DARBHANGA IN 1896.

BY SURGN.-CAPT. E. HAROLD BROWN, M.D.,

Purneah.

(Continued from page 328.)

Case 7.—Puri, Hindu, aged 50; multipara; duration two years; girth 47 inches; tumour left-sided.

The patient was an old and very weakly woman, with an enormously distended abdomen. On examination no solid matter could be detected, and the diagnosis arrived at was an unilocular cyst with probably free ascitic fluid.

The patient was perfectly crippled, being scarcely able to sit, and could not walk, owing to the size and weight of the tumour. Pulse 130.

Operation on 21st November.—Abdominal wall not vascular; incision 3 inches; peritoneum much thickened and adherent to the cyst wall. On tapping, several gallons of thin fluid escaped and the abdominal walls slowly collapsed; to expedite emptying of the cyst its anterior wall was incised, the fluid being prevented from passing into the peritoneal cavity by taking the usual precautions. On passing the hand into the cyst cavity some secondary cysts were discovered high up on the left side, and these were also emptied in the same way.

I now seized the cut edge of the cyst wall and gently separated the parietal peritoneum from it, the connection between the two being very intimate, and the whole anterior surface being thus adherent for several inches in all directions. The connections, though firm, were fibrous and there was no hæmorrhage at this stage; but at the sides, the adhesions were softer and more vascular, and, though more easily separated than the others, resulted in fairly free oozing. There were no other adhesions, the sac not having attached itself to any of the neighbouring organs, and the empty cyst was now drawn out, and its pedicle, which was of fair size, was transfixed and ligatured. As no fluid had entered the peritoneal cavity, and as there had been but trifling venous oozing, I did not think it was necessary to irrigate, so closed the wound and dressed it as usual.

When removed from the operating table the patient was in a very favourable condition, the pulse, which was 130 prior to operation, having fallen to 86. She did well for the first four days, the highest temperature being 102.2; there was no sickness or distension, but she complained of a good deal of pain. The dressings were removed on the fifth day, when the temperature was 100.4 and the pulse 116. The wound was healed, but below the umbilicus there was an irregular horse-shoe shaped swelling, extending across the middle line to the extent of two and a half inches. It was rather hard and tender, without fluctuation. The patient's general state was good; the bowels had been moved freely by natural efforts, and there was neither sickness nor tympanites, while the tongue was clean and moist.

The following day the temperature had fallen to 99°, and the parts looked better, the patient also complaining less of pain; the pulse was 100.

I was obliged to leave the station that night and, on returning twenty-four hours later, found the patient gasping, and she died in a few minutes. I was informed that she became suddenly worse about twelve hours previously, the pulse becoming irregular and intermittent; and all the symptoms gradually developed until she sank into a state of collapse.

I was not permitted to make a *post-mortem* examination, but opened up the lower angle of the wound, from which a few ounces of sanious fluid exuded; the peritoneum was thick and leathery, but there was no lymph deposited anywhere.

In this case the result might have been different had I irrigated the peritoneal cavity, but, at the time, there seemed to be no indication for this measure. Later, had I opened the lower angle of the wound, introduced a glass tube and irrigated the cavity, improvement might have set in. My having to leave the case was unfortunate, as I otherwise should certainly have opened up the wound.

It is interesting to note that there were none of the usual signs of peritonitis in this case, *e.g.*, vomiting, tympanites, constipation. The bowels were moved freely, both by the natural efforts and on the fifth day by means of a saline purge.

Death was, doubtless, due to sepsis, though the same precautions were taken with this case as with the others. The fluid removed amounted to 52 pints, and the solid matter weighed 4½ pounds.

Cases 8 and 9 were operated on by Assistant-Surgeon Nobin Chunder Dutt, and have been published by him in the *Indian Lancet*. They were both characterised by their speedy convalescence, the one recovering without any rise of temperature whatsoever; while in the other the highest temperature recorded was just over 99°. Case No. 9 proved to be a dermoid, and contained a large lock of hair and three perfect teeth.

Case 10 was also operated on by the Assistant-Surgeon, and proved to be the most difficult of the series. The tumour had grown between the two layers of the broad ligament and we were quite unable to free it, so intimate were the adhesions, that we were obliged ultimately to incise the cyst, empty out its contents and unite the cut edges to the sides of the incision in the parietes.

The patient was very weak for a long time and, at the end of the year, the wound had healed except for a small sinus at its lower angle.

Splenectomy.—Of the two cases of splenectomy one was published in the *British Medical Journal* last year, so need not be dealt with here. The patient came to see me seven months

after his discharge from hospital, and was in splendid health.

Case II.—The patient, a Hindu boy, aged 7 years, was brought to the Durbhanga Raj Hospital on the 16th of December, for a painful swelling in the abdomen. His father said that the boy had first complained of a lump there about ten months previously: it was discovered by accident, and has gradually increased in size since, having been very painful and tender of late. He is positive that there was no fever prior to the discovery of the lump.

Present condition.—As the boy lies on his back, the tumour is visible as a swelling, the size of an orange, situated in the left hypochondrium just below the costal margin. It is globular, smooth, elastic, freely movable up to a certain point, with a feeling of a deep attachment; the integument slides freely over the tumour which moves with respiration. Percussion detects dulness, continuous upwards and backwards with the splenic dulness and, on palpation, the swelling can be traced deep back into the abdomen. There is neither anæmia nor ascites; the patient is well and bright except for the pain and the great tenderness when the tumour is pressed upon or handled in any way. The temperature is normal, and the bowels are regular.

I explained the nature of the case to the patient's father and told him that operation was advisable, whereupon the boy expressed his willingness to be operated on, as the pain and tenderness made his life miserable.

Operation on the morning of December 18th.—Assisted by Dr. Trailakyanath Banerji of the Laheria Serai Dispensary, I proceeded to open the abdomen with a three-inch incision in the left linea semilunaris; the peritoneum was picked up and opened with seissors to the full extent of the wound, and the tumour was exposed, being of a dark purple colour, soft and elastic.

On passing two fingers into the abdominal cavity and examining the surroundings of the enlarged organ, I found it adherent on all sides to the parietal peritoneum, and was obliged to prolong the incision downwards in order to obtain sufficient room to deal satisfactorily with the adhesions. Ligaturing the nearer adhesions, first in two places, and severing them between the ligatures, I proceeded, as soon as possible, to deal with the suspensory ligament in a similar manner, and the tumour was then delivered through the wound, and a ligature slipped round its pedicle which was thoroughly included and most carefully tied: and the organ was then removed with seissors. There was a little venous hæmorrhage, very dark red in colour, from two points in the capsule where adhesions had been stripped off without being ligatured, but it was very slight and was soon checked.

The peritoneal cavity being carefully sponged, and the face of the pedicle having shown on inspection, that the vessels were properly controlled, I united the lips of the incision with silk-worm gut sutures, and dressed the wound with iodoform and salicylic wool.

The patient was very low when put back to bed, so I injected $\frac{1}{100}$ gr. of sulphate of strychnia hypodermically, and surrounded him with hot-water bottles. Reaction was slow, but by 4 P.M. he was much better, the temperature then being 99.4. At 8 P.M. the temperature was 101.8, and the pulse 140: he complained of a good deal of pain, but was very quiet and patient.

The subsequent history was uneventful, the morning temperature fell to the normal point on the tenth day, but there was a slight evening rise until the twenty-first day. The wound was dressed and found completely healed, on the sixth day all the stitches being removed five days later.

There was sickness on one occasion, when a round worm was vomited, and there was very slight tympanites twice which yielded to a saline aperient. The patient was discharged well on the morning of the 24th day, and has remained well since, as I have had regular accounts of him from the native doctor who originally sent him to me.

Mr. Spanton, of the Staffordshire Infirmary, published last year a list of all the cases of splenectomy on record, and there was only one patient younger than the one whose case I have just described, and I think that the successful results obtained by me ought to place this operation on a firm basis, though it has very seldom been performed hitherto in India.

MEMORANDUM.

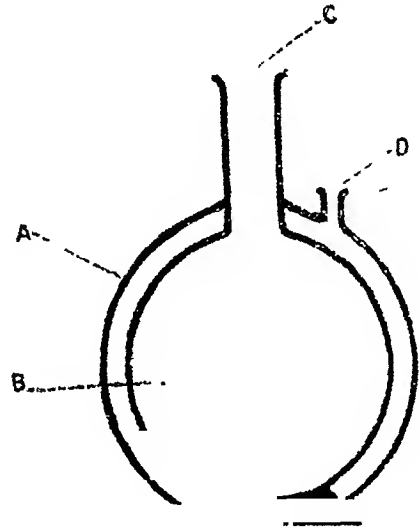
A SUGGESTED IMPROVEMENT IN SURAHIS.

By E. H. HANKIN, M. A.

(From the Government Laboratory, Agra.)

ON several occasions during the last two years, I have come across cases in which water contained in chatties or surahis was infected with the enteric microbe, while the water at its source was either free of this infection or presumably had been freed from it by boiling. Experiments carried out in this laboratory by Dr. Ghadially have shown that if enteric or cholera microbes are placed on the outside of a surahi, within from one to three days they penetrate through the porous earthenware and appear in the water inside the receptacle. Recently I have carried out an examination of water from a regimental aerated water factory in a station in which the pipe water has been infected with a microbe that reacts rapidly with anti-typhoid serum, and which is therefore probably identical with the microbe of enteric. Water coming from a stand-post near the factory contained 34 microbes of

different sorts per c. c., while the same water, after boiling and storing in a chattie contained 3,500 microbes in the same volume. In another case that I reported on more than a year ago, well water taken direct from the well appeared to contain no enteric microbes; the latter were, however, detected in a specimen of the same water after it had been boiled. It is probable that in both these cases the infection of the water was to some extent derived from the porous walls of the vessel in which it was stored.



The advantage of keeping drinking water in surahis of porous earthenware in the plains of India is that they keep the water cool owing to the evaporation that takes place on their surfaces. The figure shows in section a form of surahi that I have designed that will retain the advantage of cooling the water, while the drinking water it contains will not be so liable to infection with microbes that may be deposited on the outside of the surahi. The contrivance consists of two vessels placed one within the other. The outer vessel A is of porous earthenware. The inner vessel B is of glazed earthenware. This latter vessel contains the water destined to be drunk, and which can be poured out through the mouth C. The outer porous vessel A is filled with water through the spout D. This spout can be closed with a cork. The water in this outer vessel by its evaporation cools the contents of the inner vessel. Microbes that may penetrate into the vessel A are unable to go further into the vessel B, and thus the water that is actually drunk is protected from this source of contamination.

A similar result might be obtained by enclosing vessels of metal, glass or glazed earthenware in bags of closely woven canvas or other slightly porous material. The bag after having some water poured into it would then have its mouth tied tightly round the neck of the inner impermeable vessel.

I have asked Burn & Co., of Jubbulpore, to undertake the manufacture of the above surahis.

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Secretary,

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CALCUTTA.

Indian Medical Gazette.

NOVEMBER, 1897.

THE SCIENTIFIC STUDY OF PREVENTIVE MEDICINE IN INDIA.

To the indomitable energy and genius of a single man, who had neither influence nor large means, modern biologists owe the establishment of the magnificent Zoological Station at Naples, an institution which has become world famous amongst the scientific men of all nations.

It is not much more than thirty years ago that naturalists were wont to study marine fauna as dried or preserved specimens stored in museums, in which state they bore but a remote resemblance to the living animals. Small wonder is it that classification was in a chaotic condition, and that so little was known about the development and organs of a large portion of the Invertebrate Kingdom.

In 1870 a *privat docent* of Jena, Dr. Anton Dohrn, was inspired with the original idea of founding a marine station for biological studies, an institution wherein the fauna of the sea could be observed in their free-swimming condition. Instinctively he chose one of the most beautiful spots on earth on the shores of the Mediterranean. After encountering almost insuperable difficulties, after meeting with many rebuffs from the Italian and German governments, after spending the whole of his fortune, he finally triumphed at the end of five years' struggle and succeeded in establishing, on a secure basis, an international temple of science. It is one of the sights of Naples, and it combines laboratories, aquaria, and such accessories of a marine station as steamers and fishing boats for dredging and trawling purposes. Here students of all nationalities are assembled, and many of

the European States contribute to the maintenance of the institution, receiving in exchange the right to keep one or more investigators at the Laboratory. The German Government alone pays £4,000 per annum.

If Dohrn could effect such a result in a subject like zoology, and if another enthusiastic scientific genius was able to inaugurate the *Institut Pasteur* to deal with bacteriology and antitoxins, surely it were possible for a great and powerful government, like that of India, to found an Imperial Institute for Preventive Medicine on sound and comprehensive principles.

To clear the way, in case of any misapprehension, let us first consider what Preventive Medicine is *not*. It is not merely a matter of conservancy, sanitation and vaccination, though unfortunately that is a commonly accepted definition of it current in India. Neither is it wholly and solely a matter of bacteriology, or of antitoxins and serum-therapy. It is not simply a combination of chemistry and hygiene or of chemistry and bacteriology, though one might be led to infer that such is the case if we were to judge from the nature and designations of certain appointments in India.

The subject of Preventive Medicine has a far wider scope, and includes every subject that conduces to the health and comfort of civilised communities. It is concerned with chemistry and physics, with physiology, pathology and bacteriology, with hygiene in its narrow sense of water-supply, drainage and ventilation, with food and dietaries, clothing and buildings, trades and occupations, with epidemiology and medicine, not to mention also meteorology, climatology and geology, and in fact, everything that bears directly or indirectly on the preservation of health and the prevention of disease amongst mankind. But the attention and energy of investigators should not be confined only to problems bearing on the etiology and spread of disease. One of the main objects of such a Central Institute should be to conduct observations and experiments along practical lines, tending towards economy in imperial, provincial and local expenditure. Knowledge is power, and in no subject is that proverb more true than in its application to the health and prosperity of a nation.

C'est le premier pas qui coûte, and this should be kept in mind in the initiation of a central or imperial institute for research. Each of the pre-

sidency cities should have its laboratories for teaching purposes—chemical, physiological, pathological and bacteriological, also laboratories for provincial and municipal work—hygienic, medico-legal, excise, &c. But over and above, and quite separate from this, the Imperial or Central Institute should deal with the larger and more intricate problems that cannot be solved by merely applying to India the results obtained by observers in Europe. Each province should contribute an annual sum, raised by the Local Government and by means of private donations, towards the maintenance of this Central Institute. In exchange each province should be allowed to send one or more medical officers, specially qualified, to work at particular subjects, under the guidance and direction of a permanent Director and his Assistant.

The question of expense, and how to meet it, is an all-important one in these hard times. In all probability this could be overcome by Local Governments transferring certain second class stations, now held by members of the Indian Medical Service, to the uncovenanted branch of the Civil Medical Department, and to senior Civil or Military Assistant Surgeons. Such a procedure would be in accordance with the avowed principle of attempting to improve the prospects in these services, and at the same time the pay saved by the change would go towards the maintenance of the I. M. S. officers who would be transferred to special duty at the institute, such transfers not involving any material increase in the *cadre* of this service.

CENTRAL ASYLUMS FOR LUNATICS.

IN the ordinary course of events it is probable that ere now the proposed scheme for central asylums would have been an accomplished fact in some of the provinces of India, notably in Lower Bengal and in the Punjab, but the calamities which have followed so rapidly on each other in the shape of famine and pestilence, earthquake and war, have so drained the resources of the Imperial and Local Governments that many of the projects for hospitals and asylums, and other benevolent schemes, have had to be set aside indefinitely. While we are waiting for happier and more prosperous times, it may not be altogether inopportune to consider the subject of central asylums for the insane poor in India.

Firstly, let us see what are the objections to central asylums. One of the chief is the fact that the statistics of almost any of our Indian asylums show what a considerable factor geographical position or convenience is in the radius of utility of each of these institutions. Each asylum is supposed to tap certain districts, i.e., its area for admissions is limited usually to specified divisions and districts. The proportion of admissions from each district bears a direct ratio to its distance from the asylums, in other words, the farther a place is removed from an asylum the fewer admissions there are from it. If this is true for the five native asylums in Lower Bengal, will it not be equally true of a single large asylum? The peripheral area of neglect belonging to the circle with the greater radius will be greater than in the case of the five smaller circles.

The cynical may remark:—"So much the better for Government, because it will have fewer of the wrecks of humanity to maintain." But the conditions of modern social life in Europe and America have established firmly the principle that the mentally afflicted must be treated as Wards of the State, if there is no ostensible means for their support; and the same principle will have to be accepted in India, just as the cases of the helpless and the relief of the sick are recognised to be public duties.

Another objection is that it is now being gradually recognised that the collection of large numbers of prisoners, paupers, insanes, school children or sick people in extensive institutions is neither an unmitigated blessing nor an unqualified success. Many of the County, Borough, and District Asylums in Great Britain have been constructed somewhat on the principles of large barracks or of huge palaces, and it has been found that the resulting conditions do not favour the recovery of the patients nor conduce to their comfort.

Indian asylums mostly resemble jails, work-houses or barracks in their architectural and administrative arrangements, and, unless care is taken, the inauguration of large central asylums will merely tend to exaggerate the disadvantages mooted above.

The advantages, however, of central asylums are so manifest that they completely outweigh these drawbacks, which may be removed without much difficulty. Strict enforcement of the

provisions of the Lunacy Act and Rules for Lunatic Asylums would result in more patients being sent from the outlying districts, and an entire change of system and construction would abolish most of the evils of aggregating together a large number of insanes. This could be done by having recourse to the cottage or villa type of asylum, in accordance with which the patients are accommodated in a number of buildings scattered about the asylum grounds. These buildings are made to resemble private dwellings, and contain from a dozen to a score of individuals, and in certain classes of cases a maximum of fifty persons. This arrangement allows of classification of the cases in small groups, and tends to promote social intercourse and to conduce to recoveries. The sickly can be separated from the strong; the incurable can be segregated from the cases that are likely to recover; the noisy, dirty, violent or untrustworthy cases can be treated with greater precautions, whereas the docile and socially inclined individuals can be relieved of irksome restrictions. These results can be more effectually obtained by the cottage or villa system, such as exists at the Alt-Scherbitz Asylum in Saxony, than is possible in the pavilion or corridor asylums so common in Great Britain. The advantages of the Alt-Scherbitz system are said to be economy of construction, better classification of patients, leading to their greater comfort and convenience and usefulness, earlier and more frequent recoveries, and no increase in the number of accidents and escapes—fewer if anything.

Dr. John Sibbald, Commissioner in Lunacy for Scotland, during the current year has published a most interesting and instructive *Memoirandum on the Plans of Modern Asylums for the Insane Poor*, in which he gives a concise résumé of the types of asylums which have come into existence during the latter half of the nineteenth century, i.e., after the passing of the Lunacy Acts for England and Scotland in 1845 and 1857 respectively.

The Derby County Asylum was opened in 1851. It represented the views of Dr. Conolly, the most eminent alienist of his time. The male and female sections were separated from each other by a central administrative portion, along with the kitchen and the stores. Each section consisted of two storeys, and in each storey there were three divisions, consequently there were a dozen nearly identical wards, six for each sex.

Each division or ward consisted of a long gallery, with windows along one side, and single bedrooms for about two-thirds of the cases. There were no proper day rooms, except a small recess used for meals. All the doors were under lock and key, the windows had iron frames, and looked into airing-courts with walls seven feet high.

Great strides were made in asylum treatment and construction in the quarter of a century ending with the year 1875. In this year the Barony Asylum at Lenzie, near Glasgow, was opened. In this form of asylum, hospital and observation wards made their appearance; the upper storey was used as sleeping accommodation, and the lower for day-rooms; the rooms were like those of ordinary private dwellings. The entrances for the patients and for the public were on opposite sides of the asylum buildings, there were no walled airing-courts, and a large central dining-hall was added next to the kitchen. There was a great improvement also in the character of the fittings and furnishing. Ordinary wooden window sashes displaced the iron frames and gratings; waxed wooden floors took the place of tiled or stone floors. The doors had no inspection holes, and they were fitted with ordinary handles, thus doing away with the prison-like character of the hateful lock-and-key system.

An important point to note is the acreage area of the various asylums described by Dr. Sibbald. The Derby County Asylum (1851) had accommodation for 360 patients on an estate of 79 acres; the Barony Asylum (1875) accommodated 500 patients on 167 acres; the City of Glasgow District Asylum (1896) takes 524 patients, on an estate of 344 acres; and lastly, the Alt-Scherbitz Village Asylum has an estate of 750 acres for 960 patients.

The important advantages accruing from having a farm and extensive grounds attached to an asylum have become fully appreciated during the last quarter of a century. The Barony Asylum, which began with 167 acres, has over 450 now. A farm gives healthy outdoor occupation and a variety of interests to what would otherwise be a most monotonous existence. It further takes away from the prison-like character of an asylum, it obviates the necessity for sedentary pursuits, it makes the patients useful, it exerts a marked curative influence owing to the healthy open air exercise,

and it is frequently a considerable source of income, in addition to the fact that the farm produce diminishes the cost of maintenance.

The City of Glasgow District Asylum, at Gartloch, is constructed for 600 patients. It is an example of the pavilion system, in which each separate block is complete in itself with its day-rooms, dormitories and accessories for a special group of patients. In Dr. Sibbald's words:—"It has the advantage of making it easy to give abundance of light and air to all the apartments. It also defines in an effective manner the responsibilities of every attendant in charge of a group of patients, each block providing accommodation, both night and day, for all his or her patients. It permits likewise of each block being constructed with special reference to the requirements of the class of patients it is intended to receive, free from the hampering influence of architectural or other considerations depending on its forming part of one great building. It lends itself to the adoption of the simpler kind of structural arrangements usual in private houses; and it gives to each group of patients a feeling of having a home not of inordinate size. These separate blocks have hitherto, with few exceptions, been connected with one another, and with the central administrative and commissariat block, by covered corridors."

A most important point to note in such an asylum as this is the acceptance of the principle of two separate and more or less independent sections. The hospital section is set apart for those patients needing constant medical attention and nursing on account of either bodily or mental illness, all new admissions under observation and all such as require special watching for suicidal and homicidal tendencies, or other insane impulses. This section usually contains about one-half of the inmates of the asylum; but the figures may vary from one to two-thirds. Its buildings are of a single storey, and it has its own administrative block, dining-hall and kitchen.

The other, or non-medical section, contains the rest of the patients, who are usually chronic cases, and those who work and are easily managed. Its central building contains the office, dining-hall, amusement room, kitchen and store rooms. The patients are housed in three-storeyed pavilions connected by corridors with the central building. The day-rooms are on the

ground floor, and the sleeping accommodation above.

The special advantage of having a separate hospital or medical section is that both medical officers and hospital attendants can give more attention to the sick; moreover, it allows of the non-medical section being constructed more simply and at less cost.

The consideration of the segregated or village type of asylum, for which Dr. Sibbald avows a preference, must be deferred to a future occasion.

CAN TYPHOID FEVER BE ABORTED?

THE reply in the affirmative to this question has raised a somewhat acrimonious and unnecessary wordy war among medical men in the United States. We are not usually taught that this disease can be cut short; in fact, our chief reliance is upon maintaining the patient's strength and upon good nursing. An American physician, however, with characteristic boldness, has replied with no uncertain sound that by his method of treatment this disease can surely be aborted and robbed of its chief terrors. From time to time cases of typhoid fever, which had been cut short in the second or third week, have been reported, and it has not always been possible to beg the question by assuming an incorrect diagnosis. It would, however, be very difficult to make such an easy assumption in view of the long list of cases recorded by Dr. J. E. Woodbridge of Cleveland, Ohio, at the late meeting of the American Association; nor is it possible to assume that the 193 physicians, whose cases are quoted and tabulated by Dr. Woodbridge, are deliberately making false statements, therefore we are bound to pay attention to their truly remarkable results. It appears that some years ago Dr. Woodbridge introduced a new method of intestinal antisepsis for the treatment of typhoid fever, and we have now before us the detailed results of an extensive trial. We have not been able to accurately find out the exact formula, nor do we know the composition of the antiseptic tablets used. We gather, however, that they contain guaiacol, thymol, and formaldehyde. The method appears to be at once eliminative and antiseptic.

Within recent years we have heard much of the antiseptic treatment of typhoid fever. There is scarcely a known antiseptic agent which has not been tried,—from corrosive sublimate to beta-

naphthol,—each in its turn earning a short-lived reputation only to end in disappointment. Why the particular combination suggested by the American physician should be so successful we are unable to say, but that it is so is clear when we read of 7,827 cases with a death-rate of only 1.9 per cent. (*under two per cent.*). Moreover, the average duration of illness in 4,935 cases was only 12 days. Truly this is abortive treatment *par excellence*! Of the cases which recovered 101 had intestinal hæmorrhage, and 95 relapses are recorded. According to our author “the severity of the disease is greatly ameliorated, the symptoms minified (*sic*), all grave complications averted and dangerous sequelæ prevented.” “The tongue,” he goes on to say, “is quickly rendered moist, tympanites quickly relieved, the excrements (*sic*) lose their offensive odour, delirium is rare, and the ‘typhoid state’ unknown.” With such a record well may Dr. Woodbridge exclaim that “these results have never before been obtained, in hospital or private practice, in so large a number of cases and by so many physicians.” To anticipate the obvious criticism* that the American type of the disease is a mild one or has changed, Dr. Woodbridge quotes some recent statistics of the disease in several large hospitals in the States, which show that in the closing years of the century typhoid fever has lost none of the virulence that distinguished it forty years ago. To emphasise the extraordinary nature of his results he quotes the death-rate within the past ten years of several well-known hospitals, *e.g.*, St. Bartholemew’s 10 per cent., Boston Hospital 13 per cent., St. Louis’ City Hospital 20 per cent., while Murchison placed it at 17.4. The most favourable death-rate we have before heard of is that of Brisbane Hospital where the strict cold-bath treatment gave a mortality of only 7 per cent. All of these compare badly with Dr. Woodbridge’s “under two per cent.”

To us in India, where enteric fever is an ever-present evil, it will be very satisfactory should these remarkable results be confirmed and repeated by physicians here and in other countries. This method of treatment is sure to be tried, and we shall be glad to receive reports about it,

* The accuracy of the diagnosis in the reported cases has been challenged, but we may note that the cases treated by this method in the Bellevue Hospital, New York, answered to the serum reaction test of the Eberth bacillus.

for the present we suppress a natural scepticism and only allow ourselves to say it is almost “too good to be true.”

THE LARYMORE BOILER.

OWING to the terrible ravages caused by enteric fever amongst British troops stationed in the North-West Provinces and the Punjab, the Military authorities have decided to make an experimental trial of supplying boiled water to regiments in certain cantonments. They have shewn their wisdom in selecting the pattern of boiler invented by Mr. A. D. Larymore, the Superintendent of the Alipur Central Jail, Calcutta. This form of boiler has proved an unqualified success in the jails in which it is employed.

Recently I paid a visit to the Alipur Jail, where I saw experiments being made with a boiler of 120 gallons for Dagshai, and another of 200 gallons for Meerut. The latter is the more convenient size for stations in the plains, and ten of this kind are at present under construction.

The boiler consists of an oblong iron receptacle which is supported on and surrounded by bricks and mud, the ordinary “kutchapucka” structure so familiar in India. This arrangement serves a twofold purpose,—it allows of the boiler and bricks being transported from place to place, if necessary, and it conserves heat and prevents radiation. It is essential that every part of the metal boiler should be surrounded by bricks below and on all sides, and the surface covered by a layer of mud and cowdung. The boiler itself is not built into the brick walls; it merely rests on two longitudinal cross-pieces on the top, one in front and the other behind. The object of this is to leave a space between the bricks and the boiler on all sides as well as below, and thus the largest possible area is exposed to the heating action of the flames and hot air. Great attention has been paid to the draught of air, the fire-bars being made wider or closer together according to the fuel used. In Northern India it frequently happens that only wood is available, and this requires wider spaces between the bars.

In front there is a pipe with a tap and key resting on a metal crutch. Through this tap the boiled water is drawn off. At the back there is a waste-pipe to allow of the boiler

being flushed out. This pipe is inserted into the under surface, or floor of the metal boiler to secure perfect cleansing. On the upper surface there is a man-hole 15" in diameter, and its use is also connected with keeping the interior scrupulously clean. The chimney, a metal pipe, is at the back, and below it there is a small door through which the soot can be scraped off the boiler and brick walls.

At the time of my visit, 8 A.M., the first boiling of the 200 gallons boiler had been completed, and it had been refilled. There is an ingenious contrivance by which the fact of the water having come to the boil is announced by means of a musical steam whistle, which is an immense improvement on the ear-piercing, torture-producing horrors which a much-enduring public has to suffer from factories, locomotives and steamers.

In spite of the bricks and mud being damp, and the fuel being wood, this first boiling of 200 gallons of water had occupied only an hour and-a-half, and subsequently boilings during the day would take considerably less time.

The impression I carried away with me was that the Larymore boiler has a great future before it, and that it may prove of the greatest use in reducing the mortality from that fatal scourge, enteric fever, which seems to have such an elective affinity for the European, be he soldier or civilian.

As in the case of several of his other inventions, Mr. Larymore has not patented this one, but has placed it unreservedly at the use of the Government.

If the Military authorities have not yet tried the form of cooking-range that also emanates from the Alipur Central Jail, they might with advantage give it a trial in cantonments for either British or Native troops. This form of range has proved a conspicuous success in jails and lunatic asylums, because it ensures the utmost cleanliness and freedom from smoke with the greatest economy of fuel. Water-taps are placed directly over the cooking-vessels on the fire-places, in order to obviate the risks of contamination when the water has to be conveyed in buckets or mussels.

It could be arranged to have the boiler and the cooking-range in close proximity, so that the boiled water might be conveyed direct to the cooking cauldrons.

Medical News.

SURGEON-CAPTAIN D. M. MOIR.

THE services of DR. MOIR have temporarily been replaced at the disposal of the Military Department. He left Calcutta on 16th October for Cawnpore, handing over charge of the Editorship of this paper to DR. C. H. BEDFORD.

APPOINTMENTS OF MEDICAL OFFICERS WITH THE TROOPS ON THE NORTH-WEST FRONTIER.

SUBJOINED is a fairly accurate list of the Medical officers with the forces on the Frontier; but in these stirring times it is no easy matter to obtain full or exact information, and altering circumstances from day to day are apt to cause fresh changes.

TIRA FIELD FORCE.

FIRST DIVISION.

Surgn.-Col. Thomson, C.B., I.M.S. (with temporary rank of Surgn.-Maj.-Genl.), P. M. O.; Secretary, Surgn.-Maj. W. A. Morris, A.M.S.

1st Brigade.

Surgn.-Col. E. Townsend, A.M.S., P. M. O. No. 1 *British Field Hospital*.—Surgn.-Major H. H. Johnston; Surgn.-Capts. A. F. Tyrell, C. Dalton and J. F. M. Kelly, all A.M.S.

No. 37 *Native Field Hospital*.—Surgn.-Lt.-Col. Bookey; Surgn.-Maj. Sykes, D.S.O.; Surgn.-Capts. Vaughan and Turnbull, all I. M. S.

2nd Brigade.

No. 14 *British Field Hospital*.—Bde.-Surgn.-Lt.-Col. Ring; Surgn.-Maj. Poole, Surgn.-Capts. Healy and Braunnigan, all A. M. S.

No. 50 *Native Field Hospital*.—Surgn.-Lt.-Col. O'Connor, Surgn.-Capts. Gould, Miller and H. R. Brown, all I. M. S.

Divisional Troops.

Sec. A, No. 13 *British Field Hospital*.—Surgn.-Capt. H. J. M. Buist, A. M. S.

No. 45 *Native Field Hospital*.—Surgn.-Lt.-Col. Ahmed, Surgn.-Capt. Dawes, F. D. Browne and Fleming, all I. M. S.

SECOND DIVISION.

Surgn.-Col. Davis, D.S.O., I.M.S., P.M.O.

1st Brigade.

No. 24 *British Field Hospital*.—Surgn.-Lt.-Col. Bourke, Surgn.-Maj. O'Kief, Surgn.-Capts. Marder and Austin, all A.M.S.

No. 44 *Native Field Hospital*.—Surgn.-Maj. Shearer (vice Fink invalided), Surgn.-Capts. Dewes, Mc I. Smith, and R. K. Mitter, all I.M.S.

2nd Brigade.

Secs. C. and D., No. 9 British Field Hospital.
—Unknown.

Secs. A. and B., No. 23 British Field Hospital.—Surgn.-Capts. Addison and Reat.

No. 48 Native Field Hospital.—Unknown.

DIVISIONAL TROOPS.

No. 13 British Field Hospital, Sec. B.—Surgn.-Maj. Peard, A.M.S.

No. 43 Native Field Hospital.—Unknown.

Line of Communications.

<i>Nos. 1 and 2 Field Medical Store Depôts.</i>	} Not yet arrived. Unknown.
<i>Nos. 11 and 25 British Field Hospital.</i>	
<i>Nos. 47 and 64 Native Field Hospital.</i>	

Bde.-Surgn.-Lt.-Col. Saunders, A.M.S., P.M.O.

KURRAM MOVABLE COLUMN.

Bde.-Surgn.-Lt.-Col. Murphy, D.S.O., I.M.S., P.M.O.

Secs. A and B No. 8 British Field Hospital.—Surgn.-Maj. Spence, Surgn.-Capt. Mitchell, A.M.S.

No. 62 Native Field Hospital.—Surgn.-Maj. C. F. Willis (Bombay), Surgn.-Capts. C. T. Hudson, Bennett and Price, all I.M.S.

No. 63 Native Field Hospital, Secs. A. and B.—Surgn.-Capts. Barren and Knapton.

MARAI-ZERA FORCE.

No P.M.O., S.M.O. to do work.

No. 42 Native Field Hospital.—Surgn.-Lt.-Col. H. Hamilton, Surgn.-Capts. White, Stevens and Stevenson, all I.M.S.

PESHAWAR COLUMN.

Bde.-Surgn.-Lt.-Col. Thomsett, A.M.S., P.M.O.

No. 5 British Field Hospital.—Surgn.-Lt.-Col. Williamson, Surgn.-Capts. Healey and Hall, A.M.S.

No. 31 Native Field Hospital.—Surgn.-Major Nandi, Surgn.-Capts. Chatterton, Stevenson and Mill, all I.M.S.

No. 46 Native Field Hospital, Sec. B., Surgn.-Capt. Cleveland, I.M.S.

RESERVE BRIGADE, PINDI.

No P. M. O.

No. 6 British Field Hospital.—Surgn.-Maj. Swayne, Surgn.-Capts. Deane, Farmer and Silver, A.M.S.

No. 53 Native Field Hospital.—Surgn.-Maj. Pemberton, Surgn.-Capts. Green, Harold Brown and Hore, I.M.S.

SAMANA,

No. 52 Native Field Hospital.—Surgn.-Maj. Cunningham, Surgn.-Capts. Grainger, J. C. Milne and Davidson, I.M.S.

Surgn.-Capt. B. H. Deare is with the 1st Battn., 3rd Gurkhas, 2nd Divn. 2nd Brigade. Surgn.-Capt. F. O'Kinealy is with the 2nd Battn., 4th Gurkhas, Kurram Column; Surgn.-Capt. J. G. Jordon is doing military duty at Ferozepur

LONDON LETTER.

THE Annual Meeting of the British Medical Association at Montreal has been a great success, and has constituted a new and strong link of union between the mother country and the great colony in whose capital town the meeting has been held. The attendance, both from this country and from Canada and the United States, has been large, and the proceedings, as briefly reported in the last number of the *British Medical Journal*, appear to have been interesting and lively. The principal addresses have been published, and they leave nothing to be desired whether as regards subject-matter or the manner in which it has been handled. The address in Surgery by Dr. Mitchell Banks, of Liverpool, is specially noteworthy on account of its theme and the happy way in which it has been presented. Dr. Banks' subject is the Military Surgeon, and he selects a number of representative men of different times and countries and gives brief and very graphic sketches of their lives and works. He displays the skill, the devotion, the unselfishness of these great men and finishes his address by a few short and spirited sketches of the valour and spirit evinced by those army surgeons who in recent time have been decorated with the Victoria Cross.

He makes an appeal for more generous and just treatment of a Service which has produced men of this sort, and which contains many others whose sense of duty is quite as keen and courage quite as good as of those who have had the opportunity of gaining distinction by rising to the occasion.

He remarks very truly that it is not money that men of this sort want, but a proper recognition of their position and function in the Army. Depend upon it as long as the Military Surgeon is denied the rank which in the Army commands respect and is treated by military authorities as a sort of necessary evil with undisguised aversion and contempt, so long will the result of the competitive examination resemble the last in yielding an insufficient number of inferior candidates.

Thirty-six vacancies were advertised and nineteen candidates obtained. This number is far short of the requirements of the Service. The consequence is that more work will be thrown on

those already in the Service, and greater difficulties will be experienced in obtaining leave. Discontent will increase. The number of men leaving the Service, already considerable, will grow, and the vicious circle of insufficient supply, progressive depletion, shorthandedness, pressure, grumbling, and disgust will continue to gain dimensions and cause more and more embarrassment. The highest marks attained were below those of the fifth man on the Indian list, and fifteen men failed to obtain as many marks as the last Indian man. Something must be done to remedy this unfortunate aversion to enter the Army Medical Service; if not there will be a collapse. Many grievances have been remedied, and there is a disposition in the War Office to treat the Service justly and generously; but as long as the matter of rank and position remains unadjusted in accordance with the feelings and strong aspirations of the Medical Staff, it is hopeless to expect much improvement in the popularity and attractiveness of the Service. For the Indian Medical service, thirty-three candidates applied for eighteen vacancies. Thirty-two were reported qualified. This Service therefore continues to attract good men, and in these troublous times there is much need of good Medical Officers in India. During the past year they have had a hard time, and now the frontier troubles have come to deprive them of the much-needed rest to which many of them were looking forward. The emergency is no doubt a temporary one, as it was quite unexpected; and the strain on the Medical Services will presently relax; but it is unfortunate, that the necessity of suspending leave should have occurred at a time when rest was so well earned and much needed.

This is the season of congresses and annual gatherings of all sorts. The British Association for the Advancement of Science has held its annual meeting at Toronto in Canada, and the twelfth International Medical Congress has met at Moscow—2,000 members attending. I see that the question of holding another Medical Congress in India is being mooted, and that it is proposed that the second Indian Medical Congress should take place in 1898 in the city of Bombay. It is to be hoped that by that time the increased mortality due to plague, famine and cholera will have passed over, and that the city will have recovered its wonted salubrity. No more suitable place could be selected for the second Congress, and there seems a special fitness in holding it there for the purpose of gathering and applying the experiences gained during the trying ordeal through which the capital of the Western Presidency has passed.

There can be no doubt that the outcome of the Calcutta Congress of 1894, notwithstanding some mistakes and drawbacks, was good. It gave a stimulus to sanitation and emphasised the need of special searching scientific enquiry

into disease causes. Much useful information and experience were recorded, and the position of the medical profession in India improved. In any future Congress the questions of medical education and registration ought to obtain a prominent place on the programme. The time has arrived when the medical profession should be organised, and the State ought now to take means to secure that medical education and qualification conducted by agencies other than Government should be adequate and proper. As long as the State retained the monopoly of educating medical men in India and declaring them qualified there was less need of supervision; but when medical men are being taught and trained and furnished with diplomas to practise by private institutions, the necessity of ensuring that these great functions are performed thoroughly, practically and for the public advantage has arisen and ought to be recognised and met.

London is very empty at present, and there is a general exodus to the seaside, or abroad, of everybody who can afford it. Medical men take their holiday at this time as well as others; and it is amusing to meet them on seaside golf links, in tweeds and knickerbockers, laying in a fresh stock of vigour against the labours of the winter and spring. The paradox that a man does more and better work in 11 than in 12 months is perfectly true, and in these days of competition and high pressure the periodical rest which is a condition of sustained soundness and strength of all vital functions is more than ever requisite.

The 10th September 1897.

Service Notes.

THE EFFICIENCY OF THE ARMY MEDICAL SERVICE.

In the *United Service Gazette* for the 18th September there is a strong leading article which treats of the causes of inefficiency in the Army and Indian Medical Services. Special allusion is made to Professor Mitchell Banks' trenchant criticism at the meeting of the British Medical Association in Montreal, particularly to his statement that Government has treated the Army Medical Department meanly and shabbily.

"This is a terrible indictment against our Government, which it is not creditable should be published far and wide, as it now has been, for we must not lose sight of the important fact that at the annual meeting at Montreal learned and able men from all parts of the world were present, who must have, after hearing the address, blushed to think that our Military Medical Service was in a seething state of discontent and almost depopulated simply because our Govern-

ment can but will not do the one thing needful to place the working of the Army Medical Service on a footing, once for all, of efficiency and sufficiency.

We read from week to week of the great strain put on the Medical Services in India owing to the frontier expeditions, on which at present some 100 (medical) officers are already employed, a number that must be backed up, owing to casualties, by a strong reserve. Have we such a reserve? If so, where is it? The history of all the recent examinations for the Military Medical Services goes to show that the popularity not only of the Army Medical Staff, but even of the Indian Medical Service, is waning. The former is largely deficient in its strength, and quite unfit to perform the necessary duties in peace, not to speak of war. The replies to repeated questions during last Session in Parliament prove the statement we have just made. The promises made by Mr. Brodrick to remedy this unsatisfactory state of things remain unfulfilled. The rank of Army Medical Officers is undefined; privilege leave they cannot obtain; their home service is totally out of proportion to the regulated foreign tour owing to paucity of numbers; they have no messes at large stations with a Government grant; and numberless other disadvantages assail them. No body of well-educated gentlemen can be expected to put up with all these, and it is no wonder discontent reigns, and that, while surgeons are leaving the Service in large numbers, existing vacancies cannot be filled. Competition has long ceased, and now candidates cannot be obtained in sufficient numbers to rise to a qualifying standard of marks. It is high time that this discreditable and disgraceful state of an important branch of the public service should cease, and that it would cease is indisputable, if only the Secretary of State could be got to see things in a fair, sympathetic, and just light. The depreciation and belittling of the Army Medical Service have gone far enough. It is now time that the officers of this department should be placed in a position as to rank equal with other departmental officers and a Royal Corps formed of the Army Medical Staff and Medical Staff Corps."

MEDICAL ORGANISATION ON FIELD SERVICE.

THE medical arrangements for all the various columns serving on the North-West Frontier are said to be working excellently, with the exception of those in the Tochi Valley, where camps known to be unhealthy have been adhered to and where the sick were allowed to accumulate instead of being sent back to the base. It is possible that strategic reasons necessitated these camps being maintained, and probably the enormous strain on the Transport Department prevented the first principles of medical organisation in the field being thoroughly carried out.

DISTINGUISHED SERVICES BY MEDICAL OFFICERS ON THE NORTH-WEST FRONTIER.

SURGEON-CAPTAIN T. H. J. C. GOODWIN, A.M.S., rendered distinguished service in the action at Shabkadr, attending to all the wounded and carrying several wounded men out of fire. He was struck on the abdomen by a spent bullet, which knocked him over. Nevertheless he was up and hard at work in ten minutes, as soon as he had got back his breath and his senses.

SURGEON-LIEUT. J. H. HUGO, I.M.S., showed great coolness and devotion during the attack on the Malakand. He kept up digital compression on a large wounded artery for nearly two hours under circumstances of great personal danger.

SURGEON CAPTAIN W. G. BREYTS, A.M.S., was prominent in the fight at the Uhlan Pass, carrying down a wounded officer under fire.

MENTIONED IN DESPATCHES.

The following medical officers have been mentioned in despatches for good work and gallant conduct at the defence of the Malakand and Chakdara:—

Brig.-Surg.-Lieut.-Col. Smith, I.M.S.
Surg.-Maj. Hassan, I.M.S.
Surg.-Capt. Whitechurch, V.C., I.M.S.
Surg.-Capt. Langston, I.M.S.
Surg.-Capt. Hugo, I.M.S.

Hospital Assistant Piara Singh, who was with the 11th Bengal Lancers at Chakdara, is also mentioned.

INDIAN ARMY NURSING SISTERS.

Misses Mowbray and Barker have been doing splendid work at the Malakand. Every one is loud in their praise. They have had very hard work, and are believed to have saved several valuable lives by their excellent nursing.

THE death of Surgeon-Major-General Henry Cook, which recently occurred in Poona, deprives the Indian Medical Service of a Chief whom it can ill spare. Those whose memories go back through a generation find it difficult to recall any officer in his position, with the single exception, perhaps, of Sir William Moore, who possessed so great a hold as Surgeon-Major-General Cook on the spontaneous loyalty and confidence of his department. A man of fine physique, of transparent candour, of robust common sense, thoroughly devoted to his profession, and averse with all his soul to all the

artifices of *reclame* that characterise the self-seeker, he gave himself up with undemonstrative straightforwardness to the duty of governing the department on the lines of fair play to every man. It was in this chiefly that lay the secret of his popularity—that he tried to be scrupulously fair.—*United Service Gazette*.

THE Barclay Memorial Medal has been made over to the Asiatic Society of Bengal, and will be awarded every third year for Biological research in India. It is in commemoration of the late Surgeon-Major A. Barclay, I.M.S., who succumbed to enteric fever in Simla in 1891 while engaged in the work of the Leprosy Commission.

WE regret to learn that Surgeon-Captain L. Rogers has been ordered home on six months' sick leave. This is the penalty he has had to pay for his careful investigation of "Kala-Azar" in Assam. Hard work and exposure have induced a succession of maladies, which have resulted in a regular break-down of Dr. Rogers' health. He has shared the fate of another scientific enthusiast, Monsieur W. M. Haffkine, who returned from Assam in shattered health, and was likewise obliged to proceed to Europe to recuperate.

WE understand that Surgeon-Major A. M. Davies, M.S., is to be attached to the Office of the Principal Medical Officer, Her Majesty's Forces in India, to carry out bacteriological and sanitary investigations in Cantonments. A better selection could not have been made, because Surgeon-Major Davies has devoted much time and attention to these subjects, and has officiated as Professor of Hygiene at Netley with conspicuous success.

Current Medical Literature.

MEDICINE.

TROPICAL ABSCESS OF LIVER. (BY HOWARD AND HOOVER. *American Journal of Medical Society*).—It cannot be said that as yet the *vera causa* of liver abscess is certainly known, in spite of the reputation of the *amœba coli* of Lösch, described in 1875. Both in liver abscesses and in dysentery many amœbæ have been found. Quinke describes three kinds: two of which he says are pathogenic in man. The writers consider it probable that all "dysenteric liver abscesses are caused by the *amœba coli* or at least a similar organism."

Apparently they divide liver abscesses into two kinds—(1) amœbic or dysenteric; (2) idiopathic *i.e.*, of unknown origin, though they hint

that the latter may be due to "small amœbic ulcers in the bowel too small and insignificant to cause diarrhoea."

The account given of the clinical history is good. First they point out that an abscess may run its course without any subjective symptoms which would attract attention to the liver. We may quote a few examples—(1) Dr. Moir's case: *I. M. G.*, September, 1897. (2) Sir J. Fayrer's case: No pain; blow on liver while boxing; patient fell, vomited pus; recovered (*B. M. J.*, 1874, p. 401). (3) A. S. Adams' case: Young soldier; no pain; *post mortem*, two large abscesses. (*Army Med. Report*, 1869). (4) Haspel's case: Soldier *on the march* fell down, died from suffocation, abscess found burst into right lung. (5) Rouis' case: Soldier killed in a street row. Large abscess of right lobe of liver found at autopsy. (6) Borius' case: Soldier, *on the march* in India, knelt down to drink at a stream by the roadside. Died, *post mortem* an abscess found to have burst into peritoneal cavity.

It is surprising that vomiting, icterus and ascites are so rare; but it is said that these symptoms point to abscess in inferior parts of liver or in the quadrate lobe.

The involvement of peritoneum, it is said, may lead to a localised perihepatic friction sound, said to be diagnostic, but it must be difficult to distinguish such from pleural sounds. Pain in shoulder is due to involvement of phrenic nerve and branches of 3rd and 5th cervical nerve. The cough (*tussis hepatica*) is due to phrenic irritation. Hiccough points to involvement of diaphragm. When diaphragm is involved another symptom is noted, *viz.*, marked thoracic breathing and diminution of abdominal breathing.....When a trocar is inserted if pus flows out during inspiration the abscess is infra-phrenic (usually liver); if it flows during expiration it is supra-phrenic, *i.e.*, thoracic. The authors call attention to the number of opiuious as to the comparative safety of the abscess bursting through lungs, and quote the following figures from Ughetti:—

131 cases, no operation in 48 cases	...	76 per cent. died.
Operated 45 cases	...	42 "
Burst through lung 38 cases only	...	14 "

This course, however, will scarcely recommend itself to a modern surgeon. We may note that no mention is made of a useful clinical sign in liver abscess, *viz.*, pitting (due to slight cedema) over liver region on firm pressure with tips of fingers. This sign is, I understand, well known in the Calcutta Medical College.

PNEUMONIA. (BY W. OSLER. *American Journal of Medical Sciences*).—This disease is described as the most fatal infective disease of temperate climates. From an analysis of over two hundred thousand cases, Wells, of Chicago, puts the mortality at 18.1 per cent. In six large American and four large British hospitals the mortality was 23 per cent. Osler

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thinks that of cases seen in private practice (consultations) no less than 50 per cent succumb. He states that the disease is more fatal in the Negro than in the white man. Considering what a very severe disease pneumonia is in malarial-stricken people it is satisfactory to note that our Indian Jail statistics compare favourably with those of the best London and American hospitals. In 1896, we find in the Jails of N.-W. P. and Oudh 1,001 cases of pneumonia with 214 deaths, *i.e.*, 21 per cent. In Bengal Jails in same year we have the death-rate at 17.9, while in some jails it is much less, *e.g.*, in Bhagalpur Jail for 13 years the pneumonia death-rate was only 12 per cent.

APPENDICITIS. (*Medical Age*).—When we remember the eagerness of American surgeons to remove the offending appendix in cases of this now fashionable disease, it is worth noting the opinion of Dr. Wm. Pepper of Philadelphia, that "in appendicitis twenty cases to one are cured without operation."

Query—Have any cases of this disease in *Natives of India* been recorded?

THE PARASITES OF MALARIA. (BY DR. TEACHER. *Glasgow Medical Journal*).—Gives his experience of malarial parasites during a residence in Spain. There are two varieties: (1) Parasites of regular fever, tertian, quartan and certain quotidians; (2) parasites of irregular fever, with grave complications—here are seen the "crescentic bodies." The latter parasites are said to be of three kinds: (a) "pigmented quotidian;" (b) unpigmented quotidian; (c) malignant tertian. In these cases the parasites are small and are not found in peripheral blood. He urges the value of the microscope in cases of doubtful fever. He says the "ideal time" to give quinine is 3 or 4 hours before the onset of the expected paroxysm, but in irregular cases the indication is to get in the quinine "as soon as possible in one large dose hypodermically if necessary."

MALARIA IN ANIMALS. (*Journal of American Medical Association*).—Babès eight years ago described a malarial fever in animals. Recently Theobald Smith has published a valuable study of Texas cattle fever (fever, anæmia, hæmoglobinuria). The spleen is enlarged. Cocci are found. The parasite is called *pyrosoma legerium*, and to complete the analogy with human malaria the rôle of the mosquito is taken by another sucking parasite *ixodes bovis*. In Finland and in Italy other observers claim that there exists a similar fever with the same parasite. Celli calls the disease *Finder-malaria*.

In India we have Surra, a disease closely akin to malaria.

Query.—How is it that in reading of malarial diseases in Africa, America, and other countries, we hear of malarial hæmaturia and hæmoglobi-

binuria? Do these occur in the malarial fevers of India?

IS DIABETES INCREASING?—The *American Medical Journal* discusses this question. From facts and figures quoted there appears to be no doubt that more cases of diabetes mellitus are now-a-days met with than was the case a few years ago. Lépine has shown a great increase of this disease in Paris. Purdy notes an increase (150 per cent.) in the United States; also Saundby records an increase (70 per cent.) in the death-rate in Great Britain from diabetes.

In India its prevalence is well-known. In some respects it seems in India to take the place of general paralysis in Europe; both seem to carry off active, busy, intellectual men. I have never seen a case of diabetes among the poorer classes in India.

INFECTION BY FLIES.—In quoting the writer's case of supposed cholera diffusion by flies (*I. M. G.*, March, 1897) the *Pacific Medical Journal* considers the Burdwan case as "extremely probable,"—remarking that we are only on the fringe of the question of infection conveyance by winged insects. The Royal Society has demonstrated the power possessed by flies of carrying about bacteria with them and of retaining infection for considerable periods. It suggests the possibility of their explaining the aerial connection of small-pox.

W. J. BUCHANAN, M.B.

SURGERY.

A CONTRIBUTION TO THE STUDY OF ANASTOMOSIS OF THE HOLLOW VISCERA—A MODIFIED MURPHY BUTTON. (By JOHN S. MILLER, A.M., M.D. *The Medical and Surgical Reporter*).—Dr. Miller is Surgeon to St. Joseph's Hospital, Philadelphia. He has paid much attention to abdominal surgery, and recommends his new button after careful experiments on dogs: "Of all the time-saving devices for anastomosis of the bowel or of any of the hollow viscera, no more ingenious and useful means has been devised than the Murphy Metallic Button. . . . Briefly the most serious objection to the Murphy button is the probability of retention, obstruction and gangrene. Its disadvantages consist in the introduction of a foreign non-absorbable body, which practically occupies the intestinal calibre, and which is capable of causing fatal results. Czerny of Heidelberg (*Transactions of German Medical Congress*, August 1896), has reported eleven cases in which he used the metallic button, of which three died from gangrene of the intestine. H. H. Clutton (*The Medical Week*, October 1896), has reported a case in which he removed a large dilated sigmoid flexure and united the two ends of the divided bowel with a Murphy button. Some months later the patient began to suffer from increasing symptoms of

obstruction. On median coeliotomy the small intestine was found collapsed and empty, but the large intestine was enormously distended with liquid feces, and practically filled the abdomen. The button was found high up in the splenic flexure, and could not be dislodged. The surgeon finally cut down upon it, and took it away. He further states that this is by no means the first time that the Murphy Button has travelled upwards. Murphy attributes this peculiarity to the surgeon putting the wrong end, i.e., the heavy ends, upwards. . . . I have succeeded in replacing, with decalcified bone all of the metal of the Murphy Button except the pressure-spring, and the central ratchet cylinder. When this modified button has fulfilled its mission, the bulk of the foreign body to be passed through the intestinal canal is diminished to one quarter and the weight to one-fifth. . . . As compared with the use of the metallic button, it may be said of the decalcified bone button: (1) That the technique is the same. (2) That the accomplishment of union is the same. (3) That the time required is the same. (4) That the results are the same. (5) That there is considerable diminution in the size and weight of the foreign body to be discharged. (6) That there is lessened danger from obstruction, gangrene and retention. (7) That there is less liability for the button to travel in a reverse direction. (8) That this research proves this button capable of effecting a very even union of the intestinal walls without pseudo-membranous adhesions."

The buttons are made by Messrs. C. Lentz & Sons, of Philadelphia.

SOME METHODS OF HEALING GRANULATING SURFACES. (By FREDERICK KRAUSS, M.D. *The Medical and Surgical Reporter*).—The writer alludes to those unhealthy granulating surfaces which are generally known as ulcers. "General treatment must consist in removing, if possible, any constitutional dyscrasia, such as syphilis, etc. Especially should the quality of the blood be examined, and if found deficient, its lacking constituents should be replaced. For this purpose many remedies are recommended, among which are the inorganic salts of iron. Better than these I have found the organic salts such as are found in pepto-mangan. (Gude), extract of red bone marrow, and in bovineine.

Locally, the first thing we should invariably do, is to get rid of the irritant cause before attempting anything else. Necrosed bone or tissues should be removed. In ulcers of the lower extremities the affected leg should be elevated, as the venous stasis frequently present prevents healing. The next step should be to render the ulcer and surrounding parts thoroughly aseptic by washing and scrubbing with antiseptic solutions. The parts should not only be washed, but well rubbed, as it has

frequently been proved that antiseptic solutions washed over a part do not reach the micro-organisms. Besides the rubbing increases the active circulation of the part. In leg ulcers, I have the whole leg rubbed with alcohol before every dressing. The best antiseptic solutions for practical use are mercuric bichloride 1 to 1000, carbolic acid 1 to 50, potassium permanganate 1 to 500, or 1 to 1000, or a weak solution of formalin. In the further treatment of ulcers it is well to make three types:—

- (1) Healthy ulcers, in which there are a great number of minute granulations upon the same level or slightly higher than the surrounding surfaces.
- (2) Exuberant ulcer, or proud flesh, in which the granulations become very large and flabby, at times projecting considerably above the surrounding surfaces;
- (3) Indolent ulcers, in which the granulations are almost imperceptible upon the base of the depressed and usually dry ulcer. The edges are usually very hard and irregular in outline.

The exuberant granulations should be removed by means of caustics, as nitrate of silver or cupric sulphate, or by means of scissors, until the granulations are smaller and on a level with, or only slightly higher than, the surrounding surface. The depressed ulcer should be thoroughly curetted and the edges cut in radiating incisions whenever they are hard. [A better plan is to pare away the edges of such ulcers with a sharp knife—J. H. T. W.]. The healthy ulcer is most quickly healed by the following dressing: After preparing the ulcer as above I apply gently with a cotton swab a small quantity of a 10 per cent. solution of lactic acid. I then apply a quantity of bovineine, and quickly follow with an iodoform dressing and a bandage. The action of the lactic acid consists in producing an active hyperemia without causing any loss of tissue. Should the secretion of serum become very free, the bovineine and possibly the iodoform, must be withdrawn and soothing powders applied. Bismuth, calomel, zinc oxide starch, or a combination of these, are among the best. Aristol is also an efficient substitute. Ointments are comparatively of little value in most instances, though occasionally fresh zinc ointment seems to act very beneficially. Each case, on account of surrounding influences, becomes a law unto itself and requires treatment accordingly. . . . In very large areas skin grafting and similar operations are often of great value. Dressings of granulating surfaces should be repeated every one, two, or three days according to the degree of activity of the ulcer and the amount of secretion. The dressing should always be of such a nature that secretions are immediately absorbed, and are not allowed to accumulate upon the granulating surface.

IRRIGATION IN INTUSSUSCEPTION. (By A. JEFFREYS WOOD, M.D. *Inter-Colonial Medical Journal of Australia*).—"Intussusception in children is sufficiently rare to make reports of cases of interest to the general practitioner. The subject has recently been very thoroughly considered by D'Arcy Power in his Hunterian lectures (*British Medical Journal*, February 13th and 20th, 1897), where he deals with both its pathology and treatment.

"During the last seven months I have had three cases under my charge and all of them were relieved by irrigation under hydrostatic pressure—two cases were of five hours' duration, and the third was fifty-six hours old. D'Arcy Power sets down forty-eight hours as the limit of time, in which irrigation is likely to be successful." [The three cases are given in a condensed form.]

Case I.—Age 11 months. Taken ill December 18th, 1896; began to scream with pain, drawing her legs up on to her abdomen. A teaspoonful of castor oil was administered about 6 P.M., a very scanty motion containing blood was passed, and half an hour later about two teaspoonfuls of pure blood passed. The oil and some milk were vomited. A sausage-shaped tumour was found in the epigastric region. Under chloroform the buttocks were raised and the lower bowel was distended with air, then a long rectal tube full of water was passed into the sigmoid flexure, wet cotton-wool was packed round the tube at the anus and warm water was poured into the bowel by a funnel held four feet above the level of the buttocks. Gentle massage of the tumour was performed. After about ten minutes pressure the water flowed freely from the funnel. The water was then allowed to escape as the tumour had disappeared. A second irrigation for five minutes was made to ensure complete reduction. The child was discharged well.

Case II.—Age 11 months. Began to cry and retch about 6 P.M., April 23rd, 1897; restless, crying with pain and distressed. At 9 P.M. passed a quantity of blood, vomiting and screaming with pain. Under chloroform, a sausage-shaped tumour was felt in the upper part of the abdomen just below the edge of the liver. Treatment as in case I with same success.

Case III.—Age 6 months. Began to scream and retch 11 A.M., June 6th. A dose of castor oil was given and vomited. At 2 A.M. on the 7th he passed blood by the bowel but no fecal matter. Took the breast but vomited the milk. Under chloroform, 56 hours after onset, a distinct tumour about four inches long was felt lying transversely across the abdomen below the umbilicus. Treatment as in case I successful.

Power, in his recent lectures, mentions the experiments made by Mortimer and Mole on the pressure that the colon will successfully resist after death. It was concluded from these exper-

iments that a column of water eight feet in height usually ruptured the bowel. On referring to Starr's Text-book on Diseases of Children it will be found that Ashurst, of Philadelphia, recommends that the funnel be held as high as eight feet in children, and twenty feet in adults. One American writer relates the reduction of an intussusception, where the funnel was carried to the top of the stairs while the child was on the ground-floor. It seems from the American work that the bowel during life is more resistant than it is after death.

Safety lies in moderation, and anything from two-and-a-half to four feet will, as a rule, be found quite sufficient pressure to reduce most cases of intussusception.

A NEW THROAT SPRAY. (Dr H. L. ARMSTRONG. *New York Medical Journal*).—Dr. Armstrong strongly recommends the following as almost a specific in acute inflammation of the upper air passages, both of the traumatic and nervous varieties:—

Eucain	...	...	10 grains
Cocain Mur.	...	...	10 "
Aqua	...	...	6 ounces

Mix. The spray to be used every hour in the nose sufficient to be felt in the throat.

If the patient is taught to inhale while using the spray, so that the solution may be carried well within the larynx, it is far more beneficial than it otherwise would be.

OBSTETRICS, GYNÆCOLOGY AND PÆDIATRICS.

UTERINE HÆMORRHAGES AND RUPTURES OF THE CIRCULAR SINUS. (*Medical Chronicle*).—M. Budin has found that in some cases of hæmorrhage before delivery, no signs of vicious insertion or premature detachment of the placenta can be discovered on examination after delivery. In these cases, however, a clot, more or less voluminous, may be found adherent to the membranes and continuous with the border of the placenta. If this be carefully separated, it is found to be continuous with a tear of the circular sinus at the placental margin; occasionally also one of the large veins entering the sinus is torn. The hæmorrhage then in these cases is due to a tear in the circular sinus. This was first mentioned as a possible cause of hæmorrhage by Matthews Duncan and Jacquemier. M. Budin has, since 1893, observed 22 cases of hæmorrhage from this rupture. Insertion of the placenta in the inferior segment seems to predispose to it. The hæmorrhage may be external or concealed. The diagnosis is often difficult and can only be made out by the presence or absence of the usual signs of vicious insertion of the placenta, such as thickening of the lower uterine segment, deficient engagement of the foetus in the brim and the recognition of the placenta by examination. The prognosis is somewhat serious. Of the 22 cases of Budin, 1 mother died and 3 children were still-born.

The treatment is similar to that of accidental hæmorrhage.

THE TREATMENT OF AFTER-PAINS. (*New York Medical Journal*).—Dr. J. L. Audebert recommends an enema of fifteen grains of anti-pyrine in four ounces of boiled water; also ten drops, each of fluid extract of viburnum prunifolium and of hydrastis canadensis every two hours in a hot drink.

INDICATIONS OF SYMPHYSEOTOMY. (*Boston Medical and Surgical Journal*).—Engelmann says that the operation pertains to the intermediate degree of pelvic contraction—two centimetres or less between biparietal and pelvic conjugate or in other words with the average foetal head of America—in a pelvis of between 7 and 9 cm. ($2\frac{3}{4}$ to $3\frac{1}{2}$ in.). Pinard gives the widest scope to symphyseotomy from a conjugate of 8 cm. ($3\frac{1}{8}$ in.) above which he resorts to premature labour, to one of 5 cm. ($1\frac{3}{4}$ in.) within the absolute indications of Cæsarian section, confining Cæsarian section to a pelvis of less than 5 cm. ($1\frac{3}{4}$ in.). Leopold allows a much smaller range to the operation and applies it to the higher degrees of contraction (7.5 cm. to 6 cm.); the limit for absolute Cæsarian section. Morissani limits its application to a conjugate between 8.8 cm. and 6.7 cm. ($3\frac{5}{8}$ to $2\frac{5}{8}$ in.), very much the class of cases formerly consigned to craniotomy on the living child, and, if elective, to premature labour in the earlier months. Tarnier gives preference to symphyseotomy in pelves of less than 8 cm., though he reports a series of cases of induced labour in contractions to 6.6 cm. ($2\frac{1}{2}$ in.) unfavourable by reason of the high foetal mortality. Leopold limits premature labour to a conjugate between 8 cm. and 7 cm. cases in which at term he advocates forceps or version in the flat pelvis and version in the justo-minor above 7.5 cm., symphyseotomy below. Tarnier prefers premature labour as the method of choice in pelves above 8.6 cm.

The safety or danger of an operation is a patent argument for or against, and since symphyseotomy and the relative Cæsarian section, as now advocated, apply to the same moderate disproportion between foetal head and pelvis, to a similar class of cases it may be well to note the relative mortality of these operations more carefully.

MORTALITY OF SYMPHYSEOTOMY.

	Maternal.	Foetal.
1777-1808	34%	72%
1858-1866	26	18
1887-1893 (collected by Morissani)	11.6	12
Expunged	0.8	-
1893 in Germany, 1 in 37	2.7	-
To 1893 in America	18	23
Since 1893 in America	13	-
Expunged	2	-
During 1894 in United States, 41 cases	13.5	27
1894 Farabouf, Paris	2	-
In 1895 New York 21 cases	9	14
In 1895 Italy 53 cases	4	5
In 1895 Pin rd 44 cases	2	-
In 1895 total 303 cases from all countries, Harris	11	-
Zweifel, 23 cases	0	8

MORTALITY OF CÆSARIAN SECTION.

	Maternal	Foetal.
In Vienna Hospital first 100 years	100%	-
In Paris first 80 years ...	100	-
In Europe to 1863 ...	46	-
In America to 1863 ...	60	-
In America 1875-1885, 33 cases	74	54
In America 1882-1885 10 cases	90	80
In 1894, 44 cases in United States, Harris	27.5	-
In 1894, 40 cases in United States, Haven	22.5	-
Expunged	9	-
Leopold	15 to 20	-
Sänger	14	-

The lowest mortality of Cæsarian section is 14 per cent., and that by one operator Sängér, in a small series of cases about equal in number to the symphyseotomies reported by Zweifel without a single death; even the mortality of the 303 cases collected by Harris, a total from all countries in 1895 is only 11 per cent.

Engelmann concludes that with moderate disproportion between head and pelvis not over 2 cm. with pelvic contraction not below 7 cm. ($2\frac{3}{4}$ in.) pubic section is to be considered and is our only resource after an unsuccessful trial of forceps, if the child is to be saved, replacing the brutal craniotomy of former days.

A CASE OF SYMPHYSEOTOMY. (*Boston Medical and Surgical Journal*).—Dr. Pomeroy reports a successful case of elective symphyseotomy in a rachitic dwarf, *æt.* 21, primipara. The pelvic measurements were: inter-spinous $10\frac{1}{2}$ in., intercostal 10 in.; external conjugate 7 in.; internal diagonal conjugate $2\frac{3}{4}$ in.; true conjugate (estimated) 2 in. The foetus weighed slightly more than twelve pounds.

TREATMENT OF ASPHYXIA NEONATORUM. (*Medicine*).—Dr. Lee recommends the following plan: (1) Maintain the body heat by wrapping up the baby in warm towels or putting it in a warm full bath. (2) Free the air passages from obstructions. In the mildest cases, wipe the throat with the little finger, covered with the corner of a soft towel while the child is held up by the ankles. In the more severe cases the deeper passages must be cleared, and this is best done by means of a soft woven catheter open at the end, No. 14 French, introduced into the larynx and the contents of the trachea sucked out. In asphyxia livida, the irritation of the throat generally elicits respiration. (3) Stimulate respiration or supply air to the lungs for oxygenation of the blood. In the severest cases—asphyxia pallida—the diagnostic criterion of which is the absence of reaction in the throat—lose no time with trying the skin reflexes, but, immediately after the air passages are cleared, artificial respiration must be begun. The child is held suspended by the ankles, the forehead resting lightly on a table so as to deflex the chin and with the other hand the chest is gently squeezed anteriorly and posteriorly with sudden relaxation of the pressure. This may be repeated twenty times a minute and kept up a short time, but should the heart's action be weak, I believe

January 6th.—The cat died and was buried.

January 12th and 13th.—Child turned ill.

January 16th.—Diphtheria diagnosed clinically and bacteriologically, and case notified.

January 17th.—Child isolated.

January 18th.—Instructions issued to have cat exhumed.

January 19th.—*Post-mortem* made, serum tube inoculated with mucus from above epiglottis and incubated at 37° C., etc. A nearly pure growth of bacilli, undistinguishable from the Klebs-Löffler, obtained.

Results confirmed by Mr. A. G. R. Foulerton, F.R.C.S.

Dr. Tew produces evidence, from earlier recorded cases, to show that cats suffer from diphtheria, although in some respects the clinical features differ from those in the human subject and remarks:—

"Cats, which, in the daytime, are the usually intimate associates of young children, are frequently turned out at night, when they not only meet other cats from infected houses on the tiles, but also prowl about refuse heaps and such like foul places, where they smell over and eat infected scraps of food, returning to close contact with the children in the morning."

OBSERVATIONS ON THE USE OF ANTITOXIN IN THE TREATMENT OF DIPHTHERIA. (BY DR. WALKER DOWNIE. *The Glasgow Medical Journal*).—In his opening remarks, in a communication on the above subject, Dr. Downie made reference to the serious complications which followed the use of Koch's tuberculin, and the adverse bias with which he began the employment of diphtheria antitoxin, of the efficacy of which when employed aright and its infinitesimal evil effects of which he is now convinced. In order to appreciate the effects of the treatment, the symptoms of the disease were first discussed

Amongst which were mentioned the absence of knee-jerk, of which in the majority of cases there is early abolition which is considered of far greater importance than albumen in the urine. The essentials of the successful use of the antitoxin according to Dr. Downie are: (1) Fresh serum; (2) early administration; (3) full dose; (4) repeated injection.

In an average case seen in the earlier stages 5 c. c., equal to 500 units of immunisation, is the dose to be recommended for first injection, while double that quantity may be given when symptoms—toxæmia or laryngeal obstruction—are severe. The injection may be repeated at the end of 24 hours when marked improvement does not follow.

DIAGNOSIS OF DIPHTHERIA. (BY G. SIMS WOODHEAD, M.D. *Public Health*).—According to this authority the Löffler bacillus may or may not be found. If found, the case, however mild, may become toxic, and can communicate

the disease to other individuals in a virulent degree; if absent, the danger to the individual is less, as its infection and toxic symptoms are rare. The great majority of the bacilli are on the surface. To detect them some of the mucus should be smeared on a cover glass, and stained with Löffler's blue, or by Gramm's method. The bacilli are 3-4 μ length, straight or slightly curved, clubbed at one or both ends, and show one or more transverse bands of a lighter shade. In pure cultures they may be wedge-shaped and in pairs, but they are always in groups or heaps, never forming chains. Löffler's culture medium consists of 3 parts of blood serum, and 1 part of peptone broth, with a little soda, etc., in which the bacilli grow rapidly and appear almost alone.

Negative results of bacteriological examination are not conclusive, and therefore, the clinical features of the case must be carefully observed.

C. BANKS, M.D., D.P.H.

Vital Statistics & Sanitation.

A SHORT REPORT ON THE PLAGUE IN BOMBAY AND THE MEASURES TAKEN TO SUPPRESS IT.

BY SURGN.-MAJ. F. J. DYSON AND SURGN.-CAPT. J. T. CALVERT, I.M.S.

(Continued from page 398).

Sites for hospitals were selected in all the districts; where possible suitable buildings were secured for plague hospitals; at other places temporary structures were erected. Segregation camps were formed at convenient spots, wheeled ambulances of an approved pattern were purchased and stationed with attendants at sectional and central offices, plague hospitals and segregation camps. Hospital staffs were appointed to the various hospitals, mortuaries built, light dead carts constructed, and definite arrangements made for the speedy removal of all dead bodies to the burial ground or burning ghât. Overcrowded burial grounds were closed, whilst in those remaining open a large number of graves were kept ready dug for immediate use. At these burial grounds and burning ghâts Hospital Assistants and clerks were stationed, who entered full particulars concerning the deceased, his place of residence, cause of death, etc. A store godown was procured, a selected officer placed in charge of it, and arrangements made with contractors, chemists, etc., for the supply of disinfectant medicines, cots, blankets and hospital sundries.

Search parties for the purpose of house-to-house inspection were organised and disinfecting and lime-washing gangs formed. Rules for the guidance of District Medical Officers, of search parties, of hospital attendants, etc., were printed and distributed.

An inspecting staff was appointed to examine all persons coming into or going out of Bombay by the causeways, and arrangements were subsequently made for the examination of railway passengers and passengers coming into Bombay by sea. In consultation with the leading members of the various religious communities, and under certain conditions and restrictions, buildings were approved of as private hospitals for the members of those communities. The offices of the Plague Committee were connected by telephone with the central office of each District Medical Officer and with each Government Plague Hospital. Arrangements were made to receive at a certain hour each day reports from all plague hospitals, etc., showing number of new patients, number of deaths, number of discharges from District Medical Officers, information regarding number of cases discovered by search parties, number of houses disinfected, lime-washed, etc.; from the railways, number of persons leaving and entering Bombay, and the same information from the Collector of Customs regarding the sea traffic. From the principal papers cuttings of any information bearing on the plague were made and put up before the Committee.

31. *Districts.*—As previously stated, the island and city were divided into ten districts. These districts again were made up of sections and sub-divisions. In charge of the whole was the District Medical Officer—a Commissioned Officer of the Indian Medical Service—to assist him he had a central office with the necessary

establishment. In charge of each section or sub-division was Sub-divisional Medical Officer, who also had a small office. The District Medical Officer's duties were—

- (1) to superintend and exercise the sanitary supervision of the whole district in his charge, reporting to the Plague Committee and Health Officer daily;
- (2) to supervise the working of his district hospitals and to attend the same in routine;
- (3) to supervise the work of search parties in conjunction with the Justices of the Peace;
- (4) to control the disinfection of infected areas and buildings, latrines and night soil depôts;
- (5) to inspect all segregation camps in his district;
- (6) to call the attention at once of the officer appointed by Government for the condemnation of insanitary building to any such premises in his district;
- (7) to report on registration of burials and cremation in his districts and to supervise the sanitary condition of cemeteries;
- (8) to send daily report to the Plague Committee and Health Officer from 6 A. M. to 6 P. M., giving details of—
 - (a) what has transpired during the preceding 24 hours in his district;
 - (b) any suggestion he has to offer.

To assist him in carrying out his multifarious duties, there was attached to each district a large staff, consisting of Sub-divisional Medical Officers, Justices of the Peace, Inspectors, Sub-Inspector, muckaddums, coolies, police sepoy, military sepoy, ramoses (chaukidars), head-clerk, clerks, time-keepers, ambulance sepoy and a lady doctor or nurse (to accompany search parties). Each office was well supplied with excellent maps of the district and of the city, showing the sites of the various hospitals, segregation camps, etc. It was also provided with lists of houses in each section and the population of those houses and other necessary information. As previously noted, each central office was in telephonic communication with the office of the Plague Committee. In each district there were one or more Government and several private plague hospitals, usually the District Medical Officer held entire charge of the former, and he was invariably the supervising Medical Officer of the latter (*vide list in appendix*).

Each morning the District Medical Officer made the round of the hospitals directly under his care, and certain number of private hospitals under his supervision. He then attended certain of the search parties, inspected the segregation camps, lime-washing parties, etc. On completion of his out-door work, he proceeded to his central office to despatch his daily returns, receive reports and transact other business. At the District Central Office the following amongst other important registers were kept up:—

32. *Daily Registers*.—Giving information under the following heads:—

Date.	Cases remaining in hospital.
Quarter of the town.	Fresh admission.
Number of Justices of the Peace visiting.	Deaths in hospital.
Cases detected.	Total remaining in hospital.
	Mortality total.

Mortality plague.

Book of plague cases found on inspection giving

Date.	Casto.
Number of case.	Date of attack.
Street.	Result and date.
Number of the house.	Remarks—i.e., hospital to which sent, etc.
Name.	
Age.	

Sanitary Report Book.

Date reported.	Measures adopted, viz., disinfected, lime-washed, etc.
Locality.	Number of rooms or gullies.
Description of premises, viz., house No., street, etc.	Reporting party's name.
Sanitary defect, viz., dirty, etc.	Date when completed.

Remarks.

List of Houses and Premises vacated.

Number (serial).	Date and number of application to vacate.
Number of house and locality.	Notice issued.
Owner's name.	House vacated.
Reasons for vacating.	

Remarks.

Note.—Reasons for vacating, i.e., presence of plague cases, etc.

Application to vacate.—This application when filled in is sent to the Health Department (Municipal Office). The Health Department issues the notice, which is sent to the District Central Office and is served by the Inspector of the ward (for copies of notice, *vide appendix*).

Occupiers were given 48 hours in which to clear out, failing this they were bundled out. They were kept out for periods varying from 2—30 days, or more, at the discretion of the Medical Officers. Should only one or two plague cases have occurred, the occupiers were allowed to return to their rooms when the latter were dry.

Should, however, four or five cases have occurred, the whole house was cleared out, and the people kept out for a long period. Persons thus turned out made their own arrangements in the meanwhile. Accommodation for them was found in the segregation camps should they care to avail themselves of it. The majority, however, preferred to find other accommodation near their work or business.

House Inspection Book.—Containing reports by different inspecting officers on sanitary defects noticed by them whilst on search duties, etc.

(To be continued.)

Reviews and Notices of Books.

A HANDBOOK OF SURFACE ANATOMY AND LANDMARKS. By B. C. A. WINDLE, D.Sc., M.D. Second Edition, revised and enlarged in collaboration with T. MANNERS-SMITH, M.R.C.S. H. K. LEWIS, 136, Gower Street, London.

WE sympathise with the authors of this book, because the part of their labour to which they have devoted particular attention has been rendered nugatory through the carelessness of the printer, the binder, or the proof reader. In the preface the writers state that:—"This second edition has been carefully revised, and several new figures have been added. A sense of the importance of the relations of the brain to the cranium and scalp has led us to bestow especial attention to this section which has been largely re-written."

On turning to chapter I, which describes the face, we find that the sequence of the pages is chaotic. The first sixteen pages are in order, then the numbers run 17, 20, 17, 20, 21, 24, 21, 24, 25, 28. Whereas the first chapter should end with page 26. It is not merely the numbering of the pages that is wrong, but the error also extends to the contents, e.g., the last line on page 17 is as follows:—"Aptly described as feeling like the outstretched palm," whereas overleaf, marked page 20, the first line runs,—"birth, is horizontal in direction and communication with." There is thus no sequence of ideas. Chapter II is concerned with the scalp and its relations to the cranium and to the brain, &c. It should commence with page 27; but this is missing, so that we pass directly from page 25 to page 28, then 25, 28, 29, 32, 29, 32, after which the rest of the paging is correct.

Doubtless the well-known publishers of a magnificent series of modern medical books have already withdrawn, or will withdraw, the second edition in its present guise, and will issue an amended form of it.

PRACTICAL MUSCLE-TESTING AND THE TREATMENT OF MUSCULAR ATROPHIES. By W. S. HEADLEY, M.D., of the London Hospital. LONDON: H. K. LEWIS & Co., 1897.

THIS little volume is designed to instruct the student (and, we may add, the practitioner) in the electric treatment of those obscure and intract-

able diseases known as muscular atrophies. There is probably no department of therapeutics which has so much become the field of the quack and the advertiser as the electric treatment of disease. This is due to many causes, one of which is, not improbably, that so few students leave hospital decently acquainted with the subject. To fill this gap in knowledge, the present practical little volume is intended. In our opinion its value would be increased by a description of the instruments now-a-days used in electro-diagnosis; but, assuming this knowledge, the reader will find the first chapters an admirable guide. After clearing the ground by explaining the normal behaviour of a muscle under stimulation, the next chapter deals with the laws of electro-muscular contractility, clearly showing the method of using the continuous current, &c. Next we have the laws of abnormal contraction stated, and a couple of chapters on the "Reaction of Degeneration,"—the most important of all electro-muscular phenomena.

The volume is well illustrated by plates and diagrams, the familiar ones showing the motor points, being taken from Dr. Lewis Jones' larger volume on Medical Electricity. Perhaps the most practical portion of the book is the second part in which full details are given of the application of the currents (form, intensity, duration, electrodes, &c.) in the treatment of each disease. Another chapter follows on the use of the so-called "Swedish movement cures," with details of the physical drill.

The little volume can be recommended. Any one who reads it carefully, and practically carries out the instructions with a combined battery, cannot fail to get a clear knowledge of a somewhat difficult subject. The volume like all from the same publishers is admirably printed and got up.

THE BENGAL POLICE ADMINISTRATION REPORT FOR 1896.

WE have received a copy of this Report. Although Civil Surgeons have much to do with prisoners, their work generally begins when the Police work has ended. There are, however, several points of interest to our readers in such a report. We would like to see a discussion as to whether habitual crime is on the increase in Bengal or not. Recent measures, however, for the identification of habituals have made it well nigh impossible to compare the figures of the past few years with the older statistics.

The medical reader will turn with interest to the sections dealing with anthropometry as applied to criminal identification. In this respect the Bengal Police Department is far ahead of most countries, European or other. It is well known that the present Inspector-General of Police

introduced the Bertillon system some years ago and has worked it with great success, whereas England is only beginning to appreciate it. Notwithstanding that the Bengal results show that 42 per cent. of old offenders have been in this way identified, it has been found that a simpler method exists for the purpose. Mr. Francis Galton's system of identification by thumb and finger impressions is now, in its developed state, being substituted in Bengal for the more difficult Bertillonism. It has now become so well worked out that it is possible to telegraph in a few words the description of a man's ten "pickers and stealers," as Hamlet called them, so that they can be identified in the Central Office. If Bengal can show that finger impressions are sufficient, a great step towards international identification will be gained. Mons. Bertillon, for obvious reasons, prefers his own method, while England is endeavouring to work out a system in which both methods are used. We may add that there is still another method proposed in Italy by Mons. Anfosso, by which an individual is identified by means of the outline of his head in the vertico-longitudinal diameter, being taken by a pewter band and recorded on paper. Some experiments with this method by the writer of this review are certainly encouraging. Till one sees them one could hardly believe how very different the outlines of individual heads are. It is possible that this method would be an important aid to the other processes.

The Services.

CALCUTTA GAZETTE.

APPOINTMENTS.

Assistant-Surgeon J. N. BOSE, of the Puri Dispensary, is appointed to be an Inspecting Officer for the purpose of carrying out the provisions of the Epidemic Diseases Act, 1897, at Khurda Road Station on the East Coast Railway.

Miss DaCOSTA is appointed to be an Inspecting Officer for the purpose of carrying out the provisions of the Epidemic Diseases Act, 1897, at Damukdia, *vice* Miss K. Hedding, resigned.

Surgeon-Lieutenant-Colonel K. P. GUPTA, Civil Surgeon of Backergunge, is appointed to act as Civil Surgeon of Puri.

Assistant-Surgeon M. M. GUPTA is appointed temporarily to have medical charge of the civil station of Balasoro.

BENGAL.

The undermentioned Military pupils having passed their final examination are admitted into the service as third class Assistant-Surgeons, with effect from the 1st of April 1897:—

JOSEPH LONGMAN WREDDEN.
GEORGE HAROLD KING.
AUGUSTUS WILHELM DYER.

The services of the undermentioned officers are placed permanently at the disposal of the Government of Bengal:—
Surgeon-Captains—

C. E. SUNDER, M.B., B.S., I.M.S.
F. P. MAYNARD, M.B., I.M.S.
F. O'KINEALY, I.M.S.
F. C. CLARKSON, I.M.S.

PROMOTIONS.

Surgeon-Captains to be Surgeon-Majors (dated 1st October 1897):—

THOMAS GRAINGER, M.D.

ALFRED WILLIAM ALCOCK, M.B.

TRANSFERS.

The services of the undermentioned officers are replaced temporarily at the disposal of the Military Department:—

Surgeon-Captains—

T. GRAINGER, M.D., I.M.S.

E. H. BROWN, I.M.S.

C. R. M. GREEN, F.R.C.S., I.M.S.

The services of the undermentioned officers are placed temporarily at the disposal of the Government of India in the Home Department:—

Surgeon-Captains—

J. T. CALVERT.

NARENDRA PROSANNA SINHA.

D. M. MOIR.

The services of the undermentioned Military Assistant-Surgeons are placed temporarily at the disposal of the Government of India in the Home Department:—

Military Assistant-Surgeons—

I. BURNETT.

W. A. WILLIAMS.

G. S. O'NEAL.

G. KIRBY

H. DAY.

LEAVE.

Surgeon-Lieutenant-Colonel F. R. SWAINE has been granted an extension of furlough for one year.

RETIREMENTS.

Brigade-Surgeon-Lieutenant-Colonel CHARLES JOHN WALFORD MEADOWS. Dated 1st June 1897.

Surgeon-Lieutenant-Colonel AUGUSTUS EDWARD RICHARD STEPHENS. Dated 24th May 1897.

LANGUAGE EXAMINATION.

Surgeon-Captain F. P. MAYNARD, I.M.S., having passed an examination in the Munda language is authorised to draw the proscribed reward of Rs. 1,000.

BOMBAY GAZETTE.

APPOINTMENTS.

Surgeon-Lieutenant J. C. ROBERTSON, deputed on plague duty to Karad.

Surgeon-Captain S. E. PRALL, appointed on plague duty under the orders of the Health Officer of the Port of Bombay.

Surgeon-Major K. S. NARIMAN appointed to act as Deputy Sanitary Commissioner, Gujarat Registration District, in addition to his own duties.

The CIVIL Surgeon, Karachi, is appointed to act as Deputy Sanitary Commissioner, Sind Registration District, in addition to his own duties.

Assistant-Surgeon R. J. PETTIGARA, appointed travelling Medical Inspector between Korogau and Tasgaon.

Surgeon-Captain W. R. SCROGGIE, Senior Assistant-Surgeon, Indian Subordinate Medical Department, and Civil Surgeon, Sholapur, has been appointed to act as District Medical Officer, Sholapur, in addition to his own duties.

The CIVIL SURGEON, Nasik, is appointed to act as Deputy Sanitary Commissioner, Western Registration District.

Mr. A. S. TILBURY (retired Apothecary) has been appointed as a temporary Assistant-Surgeon and placed on Plague duty, Bombay.

Temporary Assistant-Surgeon J. H. T. GARDNER has been placed on Plague duty under the Health Officer of the Port of Bombay.

Surgeon-Lieutenant W. W. CLEMESHA, M.B., B.S., I.M.S., has been placed on Plague duty, Bombay.

MRS. ANNIE SHARP, M.D., to act as First Physician, Pestonji Hormasji Kama Hospital for Women and Children, Bombay.

MISS ANNIE L. BRENNAN, to act as Second Physician, Pestonji Hormasji Kama Hospital.

Temporary Assistant-Surgeon A. S. TILBURY has been placed in Medical charge of the Railway Inspecting Staff, Poona.

Retired Surgeon-Lieutenant PETER BARBETTO has been appointed to the Medical charge of the Railway Inspection duty at Rajewadi.

Brigade-Surgeon-Lieut.-Colonel F. C. BARKER, M.D., F.R.C.S.I., to hold charge of the office of Professor of Ophthalmic Medicine and Surgery and Professor of Comparative Anatomy and Zoology, Grant Medical College, and of the office of Ophthalmic Surgeon, Jamshedji Jijibhai Hospital, in addition to his own duties.

Retired Assistant-Surgeon E. J. THEOBOLD, Travelling Medical Inspector between Koregaon and Tasgaon in the Satara District.

th

MERCHANT, Medical Officer in charge of No. 6.

L. MEYER, M.D., Medical Officer in charge of the Plague Flying Column No. 1.

Surgeon-Lieutenant A. GWYTER, M.B., C.M., Medical Officer in charge of the Plague Flying Column No. 3.

Surgeon-Captain T. E. DYSON, M.B., C.M., reverts to Deputy Sanitary Commissioner, Gujarat Registration District.

Assistant-Surgeon S. M. MEHTA, Medical Officer in charge of the Plague Flying Column No. 5.

TRANSFER.

Surgeon-Lieutenant K. V. KURDAY, I.M.S., services have been replaced at the disposal of the Government of India.

LEAVE.

Surgeon-Captain H. C. L. ARNIM, Deputy Sanitary Commissioner, Sind Registration District, privilege leave for three months.

Miss A. M. BENSON, M.D., First Physician, Pestonji Hormasji Kama Hospital for Women and Children, Bombay, is allowed privilege leave of absence for three months.

Assistant-Surgeon BEHRAMJI HORMASJI NANAVATI, L.M. & S, Teacher of Surgery and Midwifery, Behramji Jijibhai Medical School, Ahmedabad, has been allowed to return to duty within the period of his leave.

Acknowledgments.

PAMPHLETS AND BOOKS RECEIVED.

Report on the Salt Department, 1896-97.

The Agricultural Ledger: No. 8.—Indian Manures; No. 9—Lagerstrœmia Flos-Reginæ (Jarfil); No. 17—Water-Lifts.

Administration Report of the Persian Gulf and Maskat Political Agencies, 1896-97.

Recurrent Gall-stones, by Dr. John Homans, Boston.

Leucocytosis produced by Nucleinic Acid, by Drs. D. Ames and A. A. Huntley.

Annual Report, Madras Asylums.

Annual Report, Madras Medl. Institutions.

Annual Report, Bengal Dispensaries.

Annual Report, Thagi and Dakaiti Dept.

Hygiene, by Dr. Louis C. Parkes. Published by H. K. Lewis.

Ringworm, by Dr. Aldor Smith. Published by H. K. Lewis.

Practical Domestic Hygiene, by Drs. Nottor and Firth, Longmans & Co.

Report on Kala-Azar, by Dr. L. Rogers, Assam Govt. Press.

Manual of Obstetric Practice, by Prof. A. Dührssen, M.D., translated, and edited by Dr. Taylor. Published by H. K. Lewis.

Administration Report on Persian Gulf Political Residency, 1896-7.

Merek's Index, 1897.

JOURNALS RECEIVED.

The Lancet—British Medical Journal—Glasgow Medical Journal—The Journal of the American Medical Association—New York Medical Journal—Boston Medical and Surgical Journal—Medical and Surgical Reporter—The American Journal of the Medical Sciences—Sanitary Record—Medical Press and Circular—Gazette Hebdomadaire de Médecine et de Chirurgie—Public Health Reports, United States—The Dietetic and Hygienic Gazette—Pacific Medical Journal—Occidental Medical Times—Medical and Surgical Reporter—The Australasian Medical Gazette—The Sanitary Record—Public Health Reports, United States—The Journal of the American Medical Association—The New York Medical Journal—The Boston Medical and Surgical Journal—Bulletin of the John Hopkin's Hospital. Practitioner—Therapeutic Gazette—The Medical Chronicle—The Medical Times—United Service Gazette—La Tribune Médicale—Archives Cliniques de Bordeaux—Indian Medical Record—Intercolonial Medical Journal of Australasia.

COMMUNICATIONS RECEIVED.

Surgn.-Capt. W. J. Buchanan, Buxar—Surgn.-Maj. J. H. Tall Walsh, Midnapur—Surgn.-Capt. F. P. Maynard, Ranchi—Kodarnath Das, M.D., Calcutta—Surgn.-Capt. J. M. Crawford, Nowshora—H. J. Dadysett, L.R.C.P., Bombay—Sanitary Commissioner, Bengal—Surgn.-Capt. F. O'Kinealy, Jamrud—Surgn.-Capt. L. Rogers, Bannu—Surgn.-Lt.-Col. Esmonde-White, Trivandrum—Dr. Peckley, Rangoon—Surgn.-Capt. Leumann, Bombay—Surgn.-Maj. T. R. Macdonald, Chapra—Surgn.-Capt. Duer, Rangoon—Sanitary Commissioner, Madras—Surgn.-Capt. F. J. Crawford, Madras—Mosses. Wm. Watson & Co., Calcutta.

